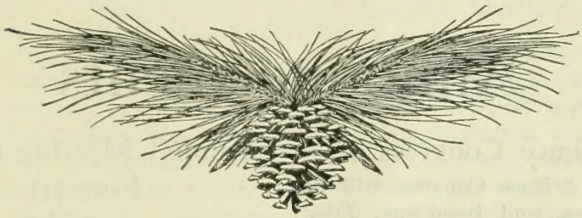
FOREST WORKER



May, 1928

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UNITED STATES DEPARTMENT OF AGRICULTURE

CONTENTS

Announcements

Pan Pacific Science Congress

The Fourth Pan Pacific Science Congress will be held in Batavia, Buitenzorg, and Bandoeng, Java, during May and June, 1929, under the auspices of the Pan Pacific Science Association, in which the United States is represented by the National Research Council. Dr. A. A. L. Rutgers, chairman of the Netherlands Indies Pacific Research Committee, is general president of the congress.

Forest Entomology at International Congress of Entomology at Cornell

The general plan outlined for the forest entomology sessions of the Fourth International Congress of Entomology, to be held at Cornell University, Ithaca, N. Y., August 12–18, is as follows:

Tuesday, August 14, 2.30: Bark beetles and other insects attacking conifers.

Wednesday, August 15, 2.30: Silvicultural and other practices in relation to forest insects.

Thursday, August 16: Miscellaneous forest and shade-tree insects.

Those desiring to present papers should get in touch with the secretary of the section on forest insects, Dr. G. H. Herrick, of Cornell University.

Annual Meeting of North Carolina Forestry Association

The North Carolina Forestry Association will hold its eighteenth annual meeting in the Goldsboro, N. C., community house, September 19–21. In connection with the meeting it is planned to hold a forestry exhibit and to give a demonstration of farm forestry.

National Conference on State Parks

The Eighth National Conference on State Parks will be held in California, beginning June 26, 1928. Meetings will be held at the Mark Hopkins Hotel in San Francisco June 26–29, and at the Chamber of Commerce, Los Angeles, July 2.

Meeting of Ecological Society of America

The Ecological Society of America will hold a meeting at Pomona College, Claremont, Calif., in conjunction with the meeting of the Pacific Division of the American Association for the Advancement of Science, June 13–16, 1928. An independent session of the Ecological Society and one in which it will join with the Western Society of Naturalists will be held probably on Thursday, June 14.

Because the free edition of this periodical is necessarily limited, it can be distributed without charge outside of the Government service only to such persons and organizations as State forestry and conservation officials, State agricultural extension directors, faculties and libraries of forest schools, and forestry associations. Others desiring to obtain copies of the FOREST WORKER can do so by sending 5 cents for a single copy or 25 cents for a year's subscription to the Superintendent of Documents, Government Printing Office, Washington, D. C. Foreign subscriptions: Yearly, 35 cents; single copies, 7 cents.

Material offered for publication in the FOREST WORKER should be addressed to the Editor, United States Forest Service, Washington, D. C.

FOREST WORKER

Washington, D. C. MAY, 1928 Vol. 4, No. 3

State Forestry

Pennsylvania Buys New State Forest Lands

After a period of years in which no land was purchased in Pennsylvania for State forests, because the legislature made no appropriation for that purpose from 1919 to 1926, the Pennsylvania State Forest Commission has just completed negotiations for the purchase of 112,740 acres. At the same time it authorized additional purchases of 60,000 acres. The acquisition of these 172,740 acres, the largest area purchased by the commission in any year since 1902, will practically exhaust the $500,000 appropriation provided by the Pennsylvania Legislature in its session of 1926-27. It will bring the total area of Pennsylvania State forests to 1,305,790 acres.

The land included in the 112,740-acre purchase just made lies in Potter, Cameron, Tioga, Union, Lycoming, Clearfield, Elk, Jefferson, Perry, Cumberland, Franklin, and Centre Counties.

South Carolina Appropriates for Forestry

The South Carolina Legislature has made an appropriation of $4,000 for State forestry activities during the calendar year 1928 under the provisions of the forestry law enacted a year ago. The State forestry commission has lost no time in dedicating a portion of this appropriation to work for the protection of the State's forests from fire, entering into an agreement with the Federal Government for cooperation under section 2 of the Clarke-McNary law.

Forest Reserve Purchases in New York

Fourteen contracts for the purchase of land for forest preserve purposes, totaling 3,299.35 acres, were approved in March by the Board of Commissioners of the New York Land Office. The 1,807.85 acres covered by nine of the contracts are located in the Catskill forest preserve, the remaining 1,491.5 acres being in the Adirondacks.

Thirty-eight States Now Cooperating in Clarke-McNary Fire Protection

Now that Indiana and South Carolina have entered into cooperation with the Federal Government in protecting their forest lands from fire, 38 States in all are thus cooperating under the provisions of the Clarke-McNary law. Of the 39 States whose timberlands make them eligible to do so, the only one that has not yet joined in this cooperative work for forest protection is Arkansas. In Arkansas, although the State itself is not active in forest protection, it is reported that private owners of forest land are spending $75,000 a year in protecting lands aggregating about 4,000,000 acres. This private work, and the work of the Forest Service on the two national forests in Arkansas, give fire protection to about one-half the pine lands in the State.

North Carolina to Study Effects of Fire on Pine Timber

In cooperation with the Cooper River Timber Co., Wilmington, N. C., the North Carolina Department of Conservation and Development is establishing plots on which to make a 10-year study of the effects of fire on timber. The first plot has been established on longleaf pine land owned by the timber company in Pender County. Three adjacent tracts, each containing one-twentieth of an acre, have been laid out, divided by hand-raked fire lines, and surrounded with a hog-tight fence and a plowed fire line 6 feet wide. The seedlings have been counted, measurements and growth studies carefully recorded for all trees, soil samples sent away for analysis, records made of the character of vegetation, and photographs taken of each plot from an established point. One tract was burned over in February, another will be burned in May or June. Throughout the period of the experiment these burnings will be repeated each year, the third tract being kept free from fire. Counts of trees, growth studies, studies of vegetation, and photographs will be made annually.

Five such plots are to be established in the different districts of the State within the present year.

White Pine Blister Rust Control Work in New Hampshire

To protect New Hampshire forests from white pine blister rust the towns and cities of the State last year spent nearly $29,000 and individuals spent more than $3,700. Aid given by the State to towns, cities, and individuals made the total outlay in 1927 almost $41,000. In many of the 77 towns and cities that made appropriations for this purpose in 1927 the work consisted in a reexamination of pine lands on which work for the eradication of Ribes had been carried out years ago. The work done in 1927 cost about 18 cents an acre.

Delaware Forestry Department Encourages Planting

During the first year of its existence the Delaware Forestry Department has distributed 46,000 seedlings for reforestation purposes. Every order for planting stock filled by the department is to be followed up to see whether the trees are planted in accordance with directions. In any case in which this is not done, the Delaware law permits the refusal of further shipments.

Near Milford, Del., a State forest tree nursery has been started on 4 acres of light, sandy loam—the typical soil of southern Delaware. It is planned to seed 1½ acres this year, and an equal area next year; the remainder will be used for producing three-year stock and transplants.

Forest fire loss in Delaware was materially reduced during the year, the forestry department reports, through the activity of some 34 volunteer fire companies situated throughout the State. These cooperating companies were equipped with forest fire fighting tools from the State forestry appropriation.

Timbered Counties in Mississippi

Ten counties of Mississippi have more than 100,000 acres each of timbered lands, according to the report of the State tax commission for the tax year 1926. These include five contiguous counties in the Yazoo Delta—Yazoo, Humphreys, Leflore, Grenada, and Calhoun. The other five extensively timbered counties are scattered through the State—Tippah, Noxubee, Leake, Pearl River, and Wilkinson. Thirteen counties have on their assessment rolls from 50,000 to 100,000 acres each of timbered lands, and exactly half the counties in the State have at least 25,000 acres apiece. For 10 counties the commission made no report on timbered lands. Timbered areas throughout the State total 3,300,102 acres, of which more than one-half is included in 19 counties of the northern half.

Special Lines of Planting Stock Supplied by the New York Conservation Department

As a vendor of forest planting stock the New York Conservation Department this year announced a number of "special lines." Because of the great demand in recent years for larger-sized trees, it has much increased its supply of transplants. To meet the steadily increasing demand for balsams, which many people are beginning to plant for Christmas trees, the State nurserymen have prepared a good supply of these trees in 3-year-old stock. An innovation is the offering of the straight-formed "Riga" variety of Scotch pine. European larch is being specially recommended by the department for farm use, as a fast-growing tree that makes good fence posts, and has been made available in large quantity in the 2-year-old size. The Saratoga nursery has been well supplied with black locust, a tree in large demand in recent years especially among farmers in the western part of the State. Because of the popularity of white pine and Norway spruce a larger supply of these trees has been provided than ever before.

In addition to growing trees the department this year is in a position to supply Carolina poplar cuttings, not rooted. These are about the size of a lead pencil and are supposed to be planted in a wet garden and cultivated for a year, at the end of which time the trees ought to be from 2 to 4 feet high and may be set out in plantations.

Additions to New Jersey State Forests

The Belle Plain State Forest has been created in Cape May County, N. J., between Belle Plain and Woodbine. The area already purchased amounts to 729 acres, and the State has options on several adjacent tracts. An addition of 676 acres has been made to the Stokes Forest, and other additions bring New Jersey's total State forest acquisitions of the past few months to 1,658 acres.

Revenue derived from the State forests of New Jersey during the past fiscal year was equal to 18 per cent of their maintenance and development costs, State Forester Wilbur reports. Most of the income was from the sale of timber cut in thinnings.

The Clarke County State Forest of Indiana has been enlarged to about 5,000 acres by a recent purchase of 142 acres. Most of the addition is in second-growth oak, hickory, and pine; about 22 acres consists of abandoned fields which will be planted to pine and spruce.

Forestry Program Committee Proposes 10-Year Plan for Worcester County, Mass.

A committee of eight, representing various local interests and the Massachusetts Forestry Association, has submitted a 10-year plan for the protection and rehabilitation of the forests of Worcester County, Mass. The committee recommends that the county be divided into four districts of about 150,000 acres each and that a woodland owners' and a forest wardens' association be formed in each of these districts. These associations would be in a position to employ foresters and cooperate effectively in carrying out forest protection, forest management, and forest utilization plans. Other recommendations include the extension of State forests to cover 10 per cent of the forest land of the county, consolidation of public forest lands, acquisition by the State of lands in districts where private owners may be slow to apply forest management because of the fire hazard, more educational work with schools and other organizations and by preventive patrol, the installation of adequate fire-fighting equipment including power pumps and of permanent fire protection crews on State forests, the erection of two additional observation towers in the county, the acquisition by each town of fire-fighting equipment to include at least 12 extinguishers or hand pumps, 12 shovels, 12 wire brooms, and a conveyance for transporting men and equipment, and the hiring of a patrolman by each town during dangerous fire seasons (from 3 to 6 weeks each year).

The county contains 970,000 acres of land, of which about 630,000 acres is in forest or brush pasture.

The committee estimates that there are about 350,000 acres in the county better adapted for forest production than for any other crop. At present the county has 127 factories engaged in making products of which wood is the chief material. The greater part of this wood and over 80 per cent of the lumber used in building is imported from the South and the Pacific coast. The rehabilitation of the forests of the county, therefore, bids fair to be a paying enterprise on more than one count.

State forests in the county now amount to 8,942 acres; 17 towns have town forests averaging about 70 acres each; the Harvard Forest is located in the county; and all the cities and most of the larger towns own watersheds or wild parks on which planting of forest trees has been done. Over 10,000 acres within the county have been planted by public and private agencies.

The objectives of forest management in the county are protection from fire, insects, and disease, the removal of "weed" trees that are interfering with the growth of valuable species, the production of better quality of timber (the market for lower grades being poor), and the development of cooperative support in management and marketing.

The committee recommends that Doanes Falls, a group of waterfalls in the town of Royalston, and the surrounding forest, be made a public park and maintained in a natural state. The members of the committee are John E. Thayer, jr., chairman, Lancaster; William H. Wheeler, Hubbardston; Joseph N. O'Kane, Dudley; A. M. Chaffee, Oxford; R. T. Fisher, Petersham; Perley Aldrich, Winchendon; Albert B. Wells; and Harris A. Reynolds, secretary, Boston.

A Profitable Town Forest

A town forest that provides fuel for schools, timbers for local bridges and town buildings, and hundreds of cords of wood for distillation, has been owned by the town of Warner, N. H., since 1919. The tract includes 800 acres of the tops and slopes of the Mink Hills, in the southern part of the town. It was acquired, a part at a time, by the late Senator William E. Chandler, who was accustomed to spend his summers in the near-by village of Waterloo and, in accordance with Mr. Chandler's wishes, after his death was presented by his son to the town.

Mr. Chandler had improved the tract by planting old fields and building roads and trails, and it included not only areas of young growth and thousands of cords of wood but fine stands of merchantable timber. Nevertheless the gift was not accepted without warm discussion in town meeting, some of the townspeople expressing grave misgivings over the "venture." During its first winter as town property the forest supplied 100 cords of wood for the heating of the town house, library, and schools, and a cut of lumber that busied a woods crew for several weeks and sold profitably. In the second winter cuttings of hardwoods for the liberation of pine provided more than 100 cords of fuel wood, of which the portion not needed for public purposes was sold to the townspeople at less than the commercial price.

In decisions relating to the management of the forest the forest committee of the town has availed itself of the advice of the State forestry department.

Open areas on the forest have been planted with pine and spruce, and the whole tract has been protected from blister rust. The income from the forest, besides paying for this work, has built up a town forest fund of $2,200.

Lewis County, N. Y., is starting a county forest this spring. The supervisors have appropriated $1,000 for reforestation work on about 200 acres of land owned by the county, and it is planned to add to this area. Schoharie County also will begin spending a $1,000 county forest appropriation this year.

Studies of County Timber Resources in North Carolina

In order that North Carolina may know more definitely just what she can offer to industries dependent on forest products, the State's department of conservation and development proposes to undertake surveys of timber resources in counties wishing to cooperate in the work. The department offers to direct and supervise the studies and to bear the expense of preparing and writing the reports, leaving it to the counties to provide for the cost of field work. Two counties have already applied for cooperation under this plan. The State will undertake not more than six such studies this summer.

State forestry work of California during the past winter included the fireproofing of 9 miles of roads in Tuolumne County in cooperation with the Bureau of Public Roads. The slash on 50 to 100 foot strips along each side of the roads was piled and burned, and the trees were trimmed. The work was later carried to a 4-mile stretch between Sonora and Jamestown, to the Lincoln Highway between Shingle Springs and Riverton, and to roads in Fresno and Riverside Counties. In Nevada, Butte, Shasta, and Placer Counties 9,166 acres of slash were burned and snags were felled.

An act of the New Jersey Legislature of 1928 extends the State's fire permit requirements and fire protective work to salt marshes or meadowland. This legislation should serve to reduce the number of marsh-burning fires and decrease the likelihood of the spread of such fires to adjoining woodlands.

The special tax bill introduced with the purpose of acquiring land for additional State forests did not pass at the recent session of the legislature.

The Kiwanis Clubs of West Virginia have organized a forestry committee, including one representative from each club. L. L. Bennett, of Belington, is chairman. The committee will arrange for forestry talks before the various clubs and will work for forestry legislation. It will endeavor to get each club to make a forest plantation as part of the local park system or to assist in the establishment of town or community forests, and will try to interest each community in the value of forest cover for watershed protection.

On the State forests of Pennsylvania 1,840 small areas are under lease as permanent camp sites. The rentals from these sites last year totaled $16,261. Buildings that have been erected on them are valued at $1,714,730.

Straight Through the Flames

Ranger Claude N. Bilbray, of the Louisiana Division of Forestry, fought victoriously for his life with a forest fire that occurred on January 14 near De Quincy, La. He had been working in front of a fire running in high grass on cut-over land. The wind, which had been moderate, suddenly increased, causing the fire to spread rapidly. Bilbray tried to outrun the flames, but soon found that this was impossible. He decided that his only hope lay in getting through the fire to the burned-over ground in the rear. Holding his hat against his face to protect his eyes, he fought his way through the flames. He estimates that at the point where he crossed the flames were 50 feet wide. Because his clothing was damp from perspiration, only his gloves ignited. His hands and the sides of his face were scorched, and he suffered great pain while being taken to De Ridder for treatment. The experience sent him to bed for several weeks and caused the temporary loss of several finger nails. Bad scars on the hands are believed to be his only permanent injury.

Blackfoot Association Triples Its Area Under Protection

The Blackfoot Forest Protective Association of Montana has greatly extended its scope this year. The association's district, which formerly comprised about 1,000,000 acres lying north and west of Missoula, now covers a gross area of 3,000,000 acres of intermingled State, private, and Government land within and adjacent to the Missoula, Bitterroot, and Lolo National Forests.

The levy on members of the association this year is 1¾ or 2 cents per acre.

T. C. Spaulding, dean of the Forest School of the University of Montana, acts as the association's chief fire warden during the summer months.

Potlatch Association Increases Its Protection Personnel

An exceptionally intensive system of fire patrol is being provided this year by the Potlatch Timber Protective Association. The association's 566,454 acres of land, in the white-pine region of northern Idaho, is to be guarded during the fire season by a corps of 93 men. This means one patrolman to 6,091 acres. In addition 55 emergency, or short-term, men are provided for by the association's 1928 budget, which calls for an expenditure of 10 cents per acre.

Blister rust control work in Vermont during 1927 included the pulling of 280,781 currant and gooseberry bushes from 19,405 acres of land, to protect approximately 5,900 acres of white pine.

One million pine seedlings are to be grown by the North Carolina forestry division under contract for an individual landowner of the sandhili section, Eldridge Johnson. According to the plan of Assistant Forester Claridge the seedlings will be reared over a period of three years. Mr. Johnson intends to plant them in the southeastern section of Moore County. Experimental plantings of longleaf pine seedlings from the first year's output of the State forest nursery have succeeded in that section and farther east.

One hundred thousand 2-year old tree seedlings have been offered this spring by the Kentucky Forest Service for reforestation and watershed-protection planting within the State. The species are red and white oak, white ash, locust, and black walnut, and prices range from $5 to $10 per thousand. Six thousand transplants of ash, maple, elm, and hackberry, from 4 to 6 feet high, have also been provided by the service to sell at 20 cents apiece for planting along highways and on school and other public property.

The kill of deer in Pennsylvania in 1927 was 14,374, of which 6,530 were shot on the State forests. Hunters on the State forests bagged 121 bear and 8 elk, and the total numbers of these animals killed in the State were 321 and 26, respectively. State records for preceding years show a rapid increase in the number of deer legally shot, from 1,939 in 1919 to 6,115 in 1922, 7,287 in 1925, and 11,646 in 1926.

In the reforesting of 4,630 acres of the New York State forest preserve last year, planting costs averaged $9.11 an acre. The expense per acre of planting individual areas ranged from $4.46 to $15.50. The largest single operation, covering 1,423 acres of Macomb's purchase, in township 20, cost $8.98 per acre.

Correction: In an item on page 4 of the March, 1928, FOREST WORKER, concerning the establishment of a game refuge on the Nantahala National Forest, N. C., the name of the county including the new refuge should have been given as Macon, not Marion.

Education and Extension

Yale Makes Changes in Courses and Requirements

Following the news that Yale University now offers the degree of doctor of philosophy in forestry comes the announcement that the Yale Forest School is modifying its requirements for the degree of master of forestry and enlarging its courses in several subjects. Under the new plan the requirements for the master of forestry degree include two years' work in technical forestry, one year of which must be in residence at Yale; a thesis representing work of an individual character; and an examination covering the general field of forestry. These changed requirements will be made effective as soon as it is feasible, and the entire plan is expected to be in effect by the collegiate year 1929–30.

Candidates for the M. F. degree will be permitted to elect any courses for which they are qualified, subject to faculty approval. Each student will be required to devote a portion of his time to investigation on some specified project, and to present his findings in the form of an acceptable thesis. Students who have already completed their undergraduate work in forestry may, if they wish, devote a major part of their time to a specified project.

Admission requirements, and the time required to obtain the master's degree in forestry, remain unchanged.

Requirements for the degree of Ph. D. in forestry include a bachelor's degree for a four-year undergraduate course in a collegiate institution of high standing, a degree in forestry, three years of graduate study, and a dissertation embodying the results of extended research and including original material worthy of publication. Not less than one year of the graduate work must be done in residence at Yale.

Candidates for the Ph. D. degree may specialize in forest production, in forest utilization, or in forest economics. A comprehensive examination in the chosen field of work must be taken by the candidate at least one year before he presents himself for the degree.

An especially important change in the courses offered by the school is the extension of work in soils. Through a cooperative arrangement with the Connecticut Agricultural Experiment Station, M. Francis Morgan has been made instructor in this subject in the Yale Forest School. Mr. Morgan will give a foundation course designed to meet the needs of forestry students and also will direct the soils work of advanced students. The course in forest entomology, also, will be enlarged. Dr. Roger Boynton Friend will give a foundation course in entomology and will direct the work of students specializing in forest entomology.

Larger opportunities for the graduate student will be afforded in the fields of forest products, forest policy, economics, and forest pathology.

Michigan School Gets More Space for Experimental Work

About 10,000 additional square feet of floor space has been made available to the Michigan School of Forestry and Conservation through an appropriation to repair the building formerly used as a heating plant for the old university hospital. Part of the basement of the building is to be used for a constant-temperature tank for experimental work in silvics; the second floor, of heavy reinforced concrete construction, affords ample space for setting up timber-testing and other machines; and the third floor has been divided into several small laboratories for forest products investigations. The old boiler room, 71 by 42 feet and about 24 feet to the rafters, provides space for the installation of wood-preservation machinery and experimental dry kilns, and even of a portable sawmill.

The location of the building is convenient for railroad shipment of timbers and material for treatment

Syracuse Students to Spend Five Weeks on Pack Demonstration Forest

Twenty-eight men in this year's graduating class of the New York State College of Forestry, at Syracuse University, will spend the last five weeks of their college life on the Pack Demonstration Forest near Lake George. There they will have instruction in field methods not only by the school's regular staff of instructors but by visiting foresters from Denmark and Switzerland. In addition to practical work in surveying and timber estimating they will lay out a working plan for the administration of the forest for the next 80 years.

Cornell Forestry Students Spend Easter Week in South Carolina Forests

Sixteen senior students in the forestry department of Cornell University visited South Carolina during their Easter vacation, as guests of the North State Lumber Co. For a week they camped in the woods 45 miles up the Cooper River from Charleston. Most of their time was spent in the logging camps of the North State Co., and they also visited the operations of the Tuxbury Lumber Co. Professor Recknagel, who conducted the party, hopes that this visit to the forests of the coastal plain may be made a regular event of the Cornell year.

A student in the University of California has been allowed to enroll as a candidate for the Ph. D. degree with forestry as his major subject. The university this year has 11 full-time graduate students of forestry, representing 10 different institutions.

Idaho Forest Experiment Station Organized

The School of Forestry of the University of Idaho announces the organization of the Idaho Forest Experiment Station as an independent division of the university. The station is composed of a forest research laboratory, the 640-acre experimental forest in Moscow Mountains which the university has been using for several years, and the university arboretum and forest nursery. Francis G. Miller, dean of the school of forestry, is director of the station, and Prof. Ernest E. Hubert has charge of the laboratory. The purposes of the station are to carry on investigations with a view of bringing about better use of forest lands and more efficient utilization of forest products and to afford training to forest school students. The laboratory will maintain an informational service for the lumber and related industries of the State.

The initial program of the station includes several research projects which the school has had in progress for a number of years. These are a study of Inland Empire Ribes in relation to blister rust control (under way two years); a study in the rate of growth and future yields of western white pine which has come in on old burns in northern Idaho; and a study of the effect of logging on the growth and form of residual species in the western white-pine type of Idaho (under way four years).

In announcing the establishment of the forest experiment station Dean Miller calls attention to the exceptional importance of forest industries in Idaho. About 20,000,000 acres of the land in the State, or about two-fifths of its total area, is classed as forest land, and of this acreage about 48 per cent still bears commercial stands of timber. The annual lumber cut is about 1,000,000,000 board feet. The State's timber industries have a valuation of $100,000,000, and their products are valued at $41,000,000 a year. Of the land grants made by Congress to Idaho for the benefit of educational and other institutions the State still owns more than 700,000 acres bearing timber stands valued at $30,000,000. The University of Idaho in its own timber grant has a potential endowment of several million dollars.

Iowa Forestry Students to Camp in Idaho

This summer's annual forestry camp of the Iowa State College of Agriculture will be held near Coeur d'Alene, Idaho. Courses will be given in applied lumbering, camp technique, timber cruising and mapping, and field silviculture. More time will be given to visiting and observing lumbering and logging camps than in previous years.

The degree of doctor of forestry is now offered by the University of Michigan.

Planting Stock for Nebraska Windbreaks and Woodlands

Trees for planting windbreaks and woodlands were sent out this spring to 2,500 Nebraska farmers as the third year's work under a Clarke-McNary agreement of the Nebraska Agricultural College with the Federal Government. The 700,000 seedlings required were raised in the Government nursery at Halsey, Nebr. As planting time approached they were lifted and brought in a refrigerator car to Lincoln. In a shed on the grounds of the agricultural college 15 students separated the seedlings, counted them, and bundled them in lots of 100.

The work of shipping the trees required 10 days, beginning April 12. Since trees can be planted somewhat later in the northern and western parts of the State, Extension Forester Watkins arranged to send the earliest shipments to the southeastern counties. The shipping tags were fastened in place on a large map of the State and were removed in geographical order, shipments going first to Richardson County in the southeast and progressively to points farther north and west.

Orders were received from every county in the State, Perkins County leading. Many came from farms of the South Platte country, where tree growing is especially difficult.

The charge was $1 for 100 trees, plus shipping charges from Lincoln. Each farmer was allowed not more than 300 trees, and the minimum shipment of any variety was 100. It had been recommended that each order include one broad-leafed species. Directions for planting and for care during the first two seasons were sent out to each individual who ordered trees.

The evergreens were 2 and 3 years old; the hardwoods were 1 year old. The evergreen species were Austrian pine, western yellow pine, Scotch pine, and Jack pine. The broad-leafed species included American elm, catalpa, cottonwood, honey locust, green ash, Russian mulberry, box elder, caragana, and Russian olive. Catalpa was distributed only in the eastern part of the State. Although maples are not hardy in the western counties, some were ordered for trial as to whether they can thrive there with special care.

Indiana Boy Scouts are to start three 50-acre forests this year, at Jasonville, Clay City, and Linton, on strip coal mining fields of the Maumee Collieries Co. The company will provide trees and tools and will give quarters to the scouts while they are doing the work. The first plantings will include 1,200 spruce, which it is planned to market as Christmas trees. Half the proceeds of Christmas-tree sales will go to the scouts.

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Lookout Towers as Educational Tools

Lookout towers are hardly less valuable as a means of public education than as a means of detecting and observing forest fires, in the opinion of Assistant State Forester W. C. McCormick, of North Carolina. In erecting several towers during the past year the North Carolina forestry division has developed the sites so as to take full advantage of this opportunity to appeal to public interest. Whenever possible, the tower is located near a main highway. A good road is constructed from highway to tower. A circular plot laid out around the tower is plowed, fertilized, and planted to carpet grass. The edge of the plot is marked with posts set at regular intervals, painted white with red at the base. Back of these posts, in the longleaf pine belt, are set even-aged longleaf pines. Directly under the tower the ground is covered with clean white sand and a register is provided which, besides inviting the visitor to sign his name, offers him forest fire signs and pamphlets. A circular road is built around the grass plot. On the surrounding land inflammable material is cleared away, the trees are trimmed, and parking space is cleared. In addition there are provided picnic tables, trash cans, lavatories, and a well.

A sign at the highway invites the public to make recreational use of the tower and site and the lookout man, who remains on duty on Sundays, is instructed to explain his work to all visitors.

Traveling Forestry Libraries for Mississippi Schools

Two traveling libraries provided by the Mississippi Forest Service are being routed to schools in the Pascagoula Fire Protection Area by the local district forester. Another set of books on trees and forests has been prepared by the service for the Coahoma County Library at Clarksdale, Miss., which distributes books all over the county by motor truck. The sets contain books on tree botany and elementary forestry, and stories of outdoor life. A recent report from one set shows in 21 days 110 readings. If this beginning works out well the State forest service intends to put other sets of books in circulation. In addition it is offering a list of recommended forestry books to schools and libraries wishing to add such books to their shelves.

Arbor Week observance was made easy for children of northern New Hampshire this year by John B. Eames, owner and operator of eight large movie and vaudeville theaters. Mr. Eames offered to supply white pines to be planted by school children, and offered to give a theater ticket to each school boy or girl who planted one or more white pines during the week.

Improvement Cutting Demonstrations on New York Farms

Woods meetings were held on 19 farms in 8 counties of New York State during the past winter to demonstrate improvement cuttings of cordwood. In each case an extension forester from the State college of agriculture went over the woodland with the owner and marked a sample area. Such trees as soft maple, beech, ironwood, and popple were marked to come out in order to give a better chance of development to valuable crop trees such as white ash, hard maple, black cherry, and basswood. Later the owner carefully cut and stacked the marked material, keeping a record of the time consumed by the work. At a second meeting, widely advertised in the community, the cutover area was inspected and its appearance was compared with that of the uncut portions of the woodland. The cordwood was carefully measured and its cash value in the woods was determined at a rate agreed upon by those present as reasonable. The average net return from the cuttings, which in each case left the woodland in better shape for future growth, was $59.30 per acre. On G. F. Allen's farm in Ontario County the return was more than $128 per acre.

A cardboard disk to be placed back of the mouthpiece on a telephone is being distributed by the North Carolina Department of Conservation and Development. Space for the local forest warden's name and telephone number is surmounted by a red-lettered direction to report forest fires to him. The remaining three-quarters of the disk is marked into sections for the insertion of other names and numbers needed for ready reference.

Erie County, N. Y., has employed a forester for educational work. The work will be jointly supported by the county, the New York State College of Agriculture, and the Federal Government. Corydon D. Kingsbury, a graduate of the New York State College of Forestry, has been chosen as county forester, serving under the title of assistant county agent in forestry.

In 22 counties of New York State 758 Four-H Club boys and girls have enrolled to begin tree planting work this year. The 1927 enrollment was 568.

To stimulate spring tree planting Oswego County, N. Y., ran a contest in eight local papers offering substantial prizes for the best five reasons "why tree planting should be encouraged on Oswego's idle acres."

NOTE.—In a letter to the editor, Henry S. Graves, dean of the Yale Forest School, writes that a statement attributed to him in the FOREST WORKER for March, 1928, in an account of the forest school conference at Berkeley, Calif., is somewhat misleading. This statement is to the effect that "the United States has nothing corresponding to the so-called intermediate forest schools of Europe, unless in the single instance of the North Dakota School of Forestry." Dean Graves expresses the belief that the ranger school of the New York State College of Forestry, which is organized as a secondary forest school, actually comes somewhat nearer the type of institution he has in mind as very necessary in this country.

Forest Service Notes

What Price Natural Regeneration?

By PHILIP C. WAKELEY, United States Forest Service

In 1927 the coast counties of Mississippi, like much of the rest of the longleaf region, enjoyed a bumper crop of longleaf pine seed. The fate of the seed in at least two of the coast counties, Harrison and Jackson, furnishes an interesting contrast to that in territories a little farther north—Pearl River County, Miss., and Washington Parish, La.

In the more northerly section seed started to fall about October 20, and in the moist weather then prevailing germinated fairly promptly. Good stands of seedlings are now observable in many places, started if not actually established.

In the more southerly section the seed fell a month earlier, during a period of drought. The crop was so heavy that P. N. Howell, of the Southern Paper Co., seriously contemplated raking seed from burned areas for use in commercial reforestation. The delay in germination caused by the drought was, however, fatal. Practically the entire crop was taken by birds, among which meadowlarks were the principal offenders. On December 21 half an hour's careful search by two men on both burned and unburned areas in Harrison County, where Mr. Howell had contemplated raking up seed, showed not a single seedling established nor a single sound seed, although blanks, empties, broken wings, and crushed hulls were common. The area examined supported 10 or more excellent seed trees to the acre.

What price natural regeneration in terms of prolonged rotation?

A Way to Develop Bushy Root Systems on Planting Stock

Large, bushy root systems that will make survival less difficult for planted trees can be produced by placing layers of rich soil some inches below the surface of nursery beds, according to the results of an experiment by the Northern Rocky Mountain Forest Experiment Station. In the Savenac Nursery, at Haugan, Mont., in the spring of 1924, three 4 by 12 foot nursery beds were excavated to a depth of 10 inches, and divided to form six plots. In each of four plots were placed 8 inches of sand and 2 inches of fertilized soil, the layer of fertilized soil being arranged at depths of 2, 4, 6, and 8 inches from the surface. The fifth bed was filled with ordinary nursery soil, and the sixth was fertilized throughout. Western yellow pine seed were sown in the six plots. At the end of the second growing season a portion of the earth was tunneled out from beneath the beds and the soil was washed down from the roots of 105 trees in each of the six plots. These trees were fastened one by one to a board ruled with parallel lines and a count was made of the roots of each at 1-inch intervals from the ground line to a depth of 14 inches.

It was found that the number of roots under ordinary nursery conditions reaches its maximum at a depth of about 5 inches, but that the layers of rich soil alternating with sand stimulate root development beyond this maximum at that and at greater depths. The response of root growth to layers of rich soil manifested itself in the lower part of, or just below, the rich soil layer.

At the end of the second growing season a plantation was made on a southeast slope with 400 seedlings from each of the six plots. A year later a similar plantation of 200 seedlings from each plot was made on a northwest slope. At the time of planting the roots of both lots were pruned to a length of 8 inches. The first plantation was handicapped by the smaller size of the trees when planted, the unfavorable site, and the drought of the summer of 1926. Its percentages of survival at the end of the first year were as follows: For seedlings from the plot of nursery soil and the plot fertilized throughout, 22; for seedlings from plots of sand having a layer of fertilized soil 2 or 4 inches from the surface, 28; for seedlings from beds of sand having a layer of fertilized soil 6 or 8 inches below the surface, 44. The trees planted at the age of 3 years had the advantages of larger size, a favorable site, and a moist first growing season in the field. For these the percentages of survival at the end of the first year were, for these same groups, 79, 76, and 91 respectively. Thus the seedlings that survived the first year after transplanting with much the greatest success were those grown in the sand plots having layers of rich soil at depths of 6 or 8 inches.

The results of this study seem to indicate that fertilizers used in growing forest planting stock should be plowed under rather than merely disked or harrowed into the soil. Some convenient way of depositing fertilizer in the bottoms of plow furrows before they are closed would be still better. Burying the fertilizer several inches underground in this way would create a greater contrast of fertility within the root zone of the seedlings, would eliminate the action of fertilizers in decreasing the effectveness of chemical treatments for the control of weeds or damping-off fungi, and would remove the danger of interference with seed germination by lumps of fertilizer materials on or near the surface.

At the Savenac Nursery the imperviousness of the subsoil prevented any serious loss of fertilizer in this experiment through downward percolation. In nurseries where soil nutrients are rapidly leached out, deep fertilization would of course involve possibility of waste.

More Gum from Fast-Growing Pines

Fast-growing pine trees yield substantially larger quantities of resin than less thrifty trees, according to figures compiled by Lenthall Wyman, associate silviculturist, United States Forest Service. Mr. Wyman's figures are based on measurements made in 1925 of the growth and gum yield of second-growth slash pine worked for naval stores under his direction at Starke, Fla. The rate of growth was determined by counting the growth rings in the outer half inch of the tree trunk. The trees were worked uniformly, with 33 streaks during the chipping season, the streaks having a maximum depth of one-half inch. The yields of gum from trees in the various growth classes were as follows:

Number of rings in outer half inch of wood	Yield of gum, in ounces
2–3	150
4–5	159
6–7	129
8–9	107
10–11	104

It would appear that with a decrease of two rings in the outer half inch there is a corresponding increase in gum yield averaging about 16 ounces. The faster-growing trees were also the larger ones, and it was estimated that their greater size accounted for about 7 ounces of this 16-ounce increment. This estimate leaves 9 ounces' gain to be accounted for by higher rate of growth.

These figures give an idea of the gains in yield of gum that may be expected of turpentine orchards when their growth rate is maintained at a high level by proper forest management. This would possibly call for the elimination of the use of fire in the management of these stands.

Railway Fusees Effective Fire-Fighting Equipment

Railway signal fusees merit a place in the standard equipment for burning slash and for fighting forest fires, according to the experience of forest officers in the Northwest who tried them out in 1927. The Pacific Northwest Forest Experiment Station, which had obtained favorable results in experimenting with the fusees in 1925 and 1926, last year distributed 2 gross to the State foresters and forest fire associations of Washington and Oregon, Federal forest officers in these States, and the forest branch of the British Columbia Department of Lands.

The fusee distributed was of the standard type, 1 by 11½ inches in size and weighing 7½ ounces. It comes in two flame colors, red and yellow, for which the manufacturers claim combustion temperatures of approximately 1,800° F. and 2,000° F., respectively. Outdoor tests of the yellow-burning fusee at the Wind River laboratory of the experiment station gave 1,950° F. as the nozzle temperature and 1,775° F. as the temperature 1 inch from the burning end.

The almost unanimous opinion of those reporting to the station on results with the fusees was that they are satisfactory in igniting light materials such as grass, needles, and duff under fair to good burning conditions. Where the fuels are damp or where relatively little fine material is present, it was found, a greater volume of heat is required than is furnished by the fusees; and to ignite logs and similar coarse material with the fusees is difficult or impossible.

The fusees were agreed to be decidedly more satisfactory than matches or pitch splinters. They were found exceptionally convenient in that they are easily carried and may be gotten into action very quickly, provide light in backfiring at night, and require no matches.

Suggestions made by the different experimenters for adapting the fusee to forest use included the elimination of the spike, packing in boxes of 20 or 25, attaching a wire handle, making the fusee larger but not longer, making it a foot longer, and supplying it with a long handle to save stooping.

The experiment station concludes that the fusee in its present form is as effective and more efficient than matches or pitch splinters in slash burning or backfiring, and may be used effectively where there is an appreciable amount of light material and burning conditions are very favorable; but that under moderate to unfavorable burning conditions where transportation is not too great a factor other means than the fusee will probably be found more advantageous. It suggests that even under burning conditions less favorable than those under which the fusee is most effective in comparison with other means of ignition, it may be advisable to use it where only a few yards or a few hundred yards of line are to be burned, especially in places difficult of access; that in addition to the size now standard a larger fusee is needed for forest use; and that the fusee should be furnished without the metal spike but with a tin ferrule crimped on the end, or some other means of attaching a handle which could be cut on the ground to whatever length is desired.

Intermountain Brush Lands not Potential Western Yellow Pine Sites

By C. F. Korstian, United States Forest Service

Ever since the national forests in the West were established, speculation and argument have waxed eloquent over the general absence of western yellow pine throughout the mountains of northern Utah, eastern Idaho, and western Wyoming. Within this region many areas lying immediately below the Douglas-fir type, a situation elsewhere occupied by western yellow pine, are now occupied by brush. Not only have these brush lands failed to seed in naturally to western yellow pine but most of the early attempts to establish plantations on them have been followed by high mortality. To determine the reasons for this state of affairs F. S. Baker (now with the University of California) and the writer undertook studies involving analyses of climatic records and collection of facts concerning the behavior of experimental plantations, the distribution of precipitation, the water relations on different sites, root development, and the tendencies of plant succession in the brush lands and in the pine lands to the north and south.

No significant differences in temperature or total annual precipitation were found to exist between these regions. The distribution of rainfall during the growing season in the brush lands, however, is notably different from that recorded either north or south of them. To the north, within the temperature zone suited to western yellow pine, the May precipitation is ample for the reproduction of this species. To the south, the July and August rainfall is generally sufficient for natural reproduction within the western yellow pine type. In the brush lands the lightness of the May rainfall, which culminates very early in the month, and the very dry weather of June, prevent spring establishment of yellow-pine reproduction; and deficiencies in July and August precipitation, combined with the fact that this precipitation usually culminates in August shortly before the early autumn frosts, make it impossible for western yellow pine reproduction to become established in midsummer as it does in the Southwest.

The soils of the brush lands, generally calcareous, heavy, and fine grained, are prevailingly unsuited for western yellow pine. While the rough outlines of the pineless belt are defined by the distribution of rainfall, the details of its boundaries are determined chiefly by local soil differences. On sandy soils and along streams, straggling tongues of pine timber extend far

from the main bodies. Even in the lands to the north and south of the brush lands where rainfall and other climatic factors are favorable, western yellow pine is not found on certain areas characterized by heavy, fine-grained soils and a flat topography, as the upper Snake River plains. Variations in the combination of factors influencing soil moisture, such as temperature, soil texture, physiography, and the presence of competing vegetation, also form a barrier to the extension of western yellow pine into the permanent brush lands. This is confirmed by the failure of many plants most commonly associated with this species to spread far into the brush lands.

The establishment of artificial stands of western yellow pine on the brush lands is by no means impossible, although generally difficult. The rainfall factors that operate against natural reproduction also tend to make planting a failure. Planting generally succeeds only on sites with moisture conditions above the average, and conspicuous success has been attained only in seasons of exceptionally heavy spring rainfall. Survival through the first two years is determined primarily by soil moisture and to a lesser extent by soil texture.

Brush-land sites otherwise suitable for planting with western yellow pine in average years generally bear a brush cover so luxuriant that the competition for light and for soil moisture would almost certainly cause the plantation to fail. It is often necessary, therefore, to select essentially poorer sites where the cover is less complete or to remove the cover before planting. Sites with shallow-rooted vegetation such as snowberry and sagebrush should be avoided, as the root competition involved signifies failure. Plantings on naturally moist and sheltered sites (north and east exposures) bearing stands of deep-rooted shrubs with light foliage, and on areas from which a shallow-rooted vegetation had been removed, proved the most successful. Plantations on open brushy areas with deep-rooted vegetation were less successful.

The three factors that must be considered in selecting planting sites—available soil moisture, root competition, and amount of shade—can be evaluated with a fair degree of accuracy through study of the vegetation on the ground.

There is no evidence that western yellow-pine stands artificially established on the brush lands will maintain themselves or spread naturally. Growth is slow and the trees are apt to be short, limby, and of poor quality. It is evident, therefore, that extensive planting of western yellow pine on many of the brush lands of the intermountain region is not now justified from a timber-production standpoint.

Investigative work of the United States Forest Taxation Inquiry in the Pacific Coast region will begin in June, with Oregon as the key State. The field work in the Lake States, begun in 1926, is being concluded this spring.

Temperature and Moisture Preferences of Forest Trees of the Southwest

Studies have been made by the Southwestern Forest Experiment Station at Flagstaff, Ariz., to determine what temperatures and what moisture conditions are preferred by various forest trees. The mountains of the Southwest offer a good opportunity for such work, because there the tree species or associations occur in well-defined climatic zones. Climatic records were taken for each of seven vegetational zones or forest types extending from the desert, at an altitude of 5,000 feet, to the upper limit of tree growth in the San Francisco Mountains, at 11,500 feet.

Coolness and moisture were found to increase consistently with altitude. The data obtained through these studies, and also the Weather Bureau records for mountain regions of Arizona and New Mexico, showed remarkable uniformity in the temperatures and precipitation characterizing the zones occupied by given forest types. The minimum temperature and moisture requirements of each species were roughly determined. For each tree species covered by the studies, it was found, the upper altitudinal limit is determined by deficiency of heat and the lower limit by deficiency of moisture.

Allegheny Station's First Experimental Forest

The first area leased by the Allegheny Forest Experiment Station for use as an experimental forest is a 500-acre tract near Medford, Burlington County, N. J., owned by Camp Ockanickon (Inc.) This organization, which represents the Y. M. C. A.'s of Burlington, Camden, Gloucester, and Monmouth Counties, N. J., has promised the station 40 years' use of the 320 acres of the property that are not actually used for camp work. Since the tract is only 28 miles from Philadelphia, it will be used as the station's headquarters forest. It shows a variety of forest conditions. The most common cover, which is present in stands varying in age from 5 to 40 years, is a hardwood mixture containing various oaks and red maple. Shortleaf, pitch, and scrub pine occur throughout the hardwood mixture and also as almost pure stands. The pine is principally young growth, but includes a few small areas of older timber. Fires have been common in the past, but only a small portion of the area has been burned as recently as five years ago. On part of the tract pine stumps 2 to 3 feet in diameter attest the size of the original stand. White cedar formerly occurred along the streams and in the swamps but has been almost entirely removed. The soils are typical of the coastal plains region, being chiefly sands and sandy loams with swamp muck in the bogs and stream bottoms. Through cooperation with the New Jersey Agricultural Experiment Station the soils of the tract are to be mapped.

Radio on the Fire Line

By Roy Headley, United States Forest Service

About the 1st of June the Forest Service will enter upon a new phase of its adventures with radio. More than a year ago D. L. Beatty, of the district office of the Forest Service at Missoula, Mont., devised a portable radio set weighing less than 7 pounds that received the voice and transmitted in code with astonishing success. Mr. Beatty was assigned to further work along this line, and during the past fall and winter has given most of his time to problems that must be dealt with before radio apparatus is adapted for use in protecting the national forests. He has visited experts and laboratories on the Pacific coast, gathering information on developments in the use of short-wave-length channels and in lightweight equipment. Now he is coming east to enlist the aid of the Bureau of Standards, the Navy Department, and the research laboratories of battery makers.

The Forest Service wishes to avoid any radio research which other agencies can be expected to undertake. It seems clear, however, that regardless of the rapid development in this field no one outside the service can be expected to make the investigations necessary to adapt radio communication to the peculiar requirements of national forest protection.

One of the troublesome questions with which Mr. Beatty will deal is that of obtaining from the Radio Commission authority to use wave lengths. It seems possible that unless the Forest Service acts promptly all the waves of all lengths will be fully occupied, with no room left for forest protection! A perplexing difficulty presents itself in the idiosyncrasies of the short waves. Some will work in daytime and not at night, others will work at night and not in daytime. Some follow the ground for 15 miles and then take a long skip; others apparently go straight up in the air and never come down again.

Everyone familiar with forest fire control work in regions where it often involves much foot travel will appreciate the desirability of a radio set light enough to be carried on a man's back with his emergency rations, enabling a fireman when he reaches a fire to inform headquarters either that he does or that he does not need help. Whether this extreme requirement for lightness can be met is uncertain; but it now appears reasonably sure that a low-power code-transmitting and voice-receiving set can be developed that will be light enough to be packed on a horse and sturdy and simple enough to be used in the thousands of trail-construction camps maintained on the national forests during the fire season. It is vital to keep these camps in communication, in order that the trail makers may be summoned to help in fighting fires, but it is practically impossible to keep them all tied in with emergency lines to the existing system of telephone communication. Trail camps move frequently, and there are too many of them to permit of fully workable communication by ground wire.

While a means of keeping trail-construction camps in communication is the largest immediate stake for which the radio research program is playing, the Forest Service has other important uses for radio equipment. It is distinctly possible that a radio compass may be employed in such a way that a fireman who is not able to find his fire may learn from a lookout man his location and the approximate distance to the fire. Large fire-fighting crews are now usually tied in to permanent telephone lines by the use of emergency wire; but this arrangement, at best rather cumbersome and unsatisfactory, will largely be displaced by the use of radio if the hoped-for adaptation of radio becomes a reality.

Gray Clouds for Lightning Fires

The most dangerous lightning storms come from clouds that are gray, or dust-colored, according to an analysis by Ranger A. T. Macnab of lookout reports on the St. Regis district of the Lolo National Forest, Mont. These clouds, says Ranger Macnab, generally are high and move slowly. Rain from them is usually heavy, but is confined to a narrow streak in the center of the storm, while the lightning is heavy on the outer edges. When clouds are dark blue, on the contrary, the storm is characterized by heavy rain throughout its length, and although the lightning generally precedes the rain the heavy rain puts out most of the fires.

The Missoula, Mont., district office of the Forest Service would be glad to hear of other observations on the relation of the color of clouds to lightning and precipitation.

New Method for Spreading Ammonium Sulphate on Nursery Beds

A new method of treating seed beds with ammonium sulphate has been put into use in the Bessey Nursery, at Halsey, Nebr. The acid sprinkler used at the nursery consists of a 50-gallon wooden barrel and a truck wide enough to straddle the beds. The barrel has in its bottom a lead pipe through which holes have been drilled and through which the barrel's contents are spread on the seed beds as it is drawn over them. In preparing for the fertilizer treatment a double muslin sack containing the required amount of ammonium sulphate was held over this barrel, the nozzle of a hose was thrust into the sack, and the water was turned on. By the time the barrel was full the charge of ammonium sulphate had all been dissolved, hard or foreign substances contained in it being left in the sack. The resulting solution was sprinkled over the seed beds much more uniformly and satisfactorily than the dry ammonium sulphate could have been spread by hand.

New National Forest Purchase Areas

Two areas in the upper peninsula of Michigan totaling 400,000 acres have been approved by the National Forest Reservation Commission for purchase for national forest purposes. One of 250,000 acres surrounds the Marquette district of the Michigan National Forest. Nearly all of this area once supported a heavy stand of Norway pine, and the north and west portions bore fine stands of hardwoods. About 79 per cent of the area has been repeatedly burned and will require replanting; 15 per cent has been burned or cut over but is restocking naturally. The 150,000-acre Mackinac unit likewise has been largely deforested, by logging and fire, but offers excellent possibilities of forest regeneration.

Other purchase units newly approved by the National Forest Reservation Commission include the Black River and Wambraw areas in the coastal section of South Carolina, the Catahoula, Kisatchie, and Vernon areas in middle-western Louisiana, and the Superior and Tawas areas in Minnesota and Michigan, respectively.

Purchases directly authorized by the commission this year include 23,977 acres of land to be added to established national forests. Of this total 19,994 acres will constitute an addition to the Superior National Forest, 3,960 acres will enlarge the Michigan National Forest, and 23 acres will be added to the Monongahela National Forest for use as a nursery site.

How Many Seeds to the Pound?

The weight of forest tree seed varies considerably in different annual crops and even in different localities. Records for a number of years kept by D. S. Olsen, chief of planting in the Northern Rocky Mountain National Forest District, show the following numbers of seed per pound:

Species	Range	Average
Western white pine	24, 720–28, 802	26, 657
White-bark pine	2, 784	2, 784
Limber pine	5, 610	5, 610
Western yellow pine	[1] 8, 510–9, 671	9, 090
Engelmann spruce	210, 964–230, 600	222, 753
Douglas fir	36, 014–44, 950	41, 168
Western larch	129, 861–174, 450	154, 643
Western red cedar	245, 165–362, 872	303, 482
Mountain hemlock	207, 910	207, 910
Western hemlock	274, 875–323, 999	299, 437
Alpine fir	51, 262	51, 262
Lowland white fir	23, 858–44, 270	34, 064

[1] Figures given are for western Montana seed. That collected in the Black Hills of South Dakota runs as high as 18,000 to the pound.

General Forest News

Major Forestry Laws Enacted

The McSweeney-McNary bill to establish a definite policy for forest research in the Department of Agriculture and to codify existing Federal forest research legislation was approved by the President on May 22, having been passed by both houses with only slight amendments. This law authorizes a 10-year program of forest research in the Forest Service, the Bureau of Biological Survey, the Bureau of Plant Industry, the Bureau of Entomology, and the Weather Bureau. It provides for annual appropriations not to exceed a total of $3,225,000. It also authorizes a total of $3,000,000 for a survey of American forest resources.

The McNary-Woodruff bill was approved as law by the President on April 30. The law authorizes the appropriation of $2,000,000 for the fiscal year beginning July 1, 1928, and $3,000,000 for each of the two succeeding fiscal years, to be used in acquiring lands for forest purposes under the Weeks law as it has been amended by the Clarke-McNary law.

The Agricultural Appropriation act as approved by the President on May 16 contains the same appropriations for the Forest Service that were provided for by the bill as it passed the House, except that an additional $10,000 is allowed for the purchase of tree seeds, nursery stock, etc., and the forest road item has been increased by $1,000,000.

Flood Control Committee Indorses Forestry Program

The report of the House Committee on Flood Control, submitted by Chairman Frank R. Reid on March 29, reads in part as follows:

The committee indorses the position of the Forest Service as brought out in the hearings by statements of Col. W. B. Greeley, Chief of the Forest Service; Associate Forester E. A. Sherman; Dr. Raphael Zon, director of the Lake States Forest Experiment Station, and many others, that the consideration of forest cover on certain critical watersheds in the Mississippi Basin is essential in a comprehensive plan for flood and erosion control, as a supplement to engineering works.

Hence the committee recommends for special consideration by the appropriate committees of Congress, legislation or appropriations designed for—

1. The acquisition of national forests upon critical watersheds in the Mississippi Basin and the protection or restoration of forest cover on such areas.

2. The extension of adequate fire protection to all forest lands in the Mississippi watershed by the Government in cooperation with the States concerned.

3. Greater Federal effort in producing and distributing forest planting stock for the reforestation of denuded or waste lands and submarginal farm lands in cooperation with the States.

4. All possible emphasis upon extension work in forestry among owners of farm woodlands in the Mississippi Basin to promote the proper care, management, and use of farm woods and wood lots in cooperation with the States; and the expansion of this cooperative service to include all classes of private forest lands.

5. The investigation of forestry and other methods of erosion control on badly eroded areas in the Mississippi drainage.

The 1927 Flood Damage to Young Hardwoods

By G. H. Lentz

In the course of investigations by the Louisiana Department of Forestry and the Southern Forest Experiment Station it was noted that the high water of the 1927 Mississippi flood had caused serious damage to the young growth and the hardwood reproduction throughout a considerable part of the hardwood bottom-land type. Where the flood water stood for any considerable length of time and where it was deep enough to cover the trees, it generally caused their death. Saplings too tall to be more than partially covered by the high water had their lower branches killed and their growth retarded in proportion to the loss of crown. Trees whose crowns were entirely above the high-water line have shown no indication of damage from the flood.

Young trees were killed by the flood waters in East and West Carroll, Madison, Tensas, Concordia, Catahoula, Richland, Franklin, and Avoyelles Parishes. The species were various oaks, red gum, hickory, ash, and elm. Outside the Mississippi levee the willows and cottonwoods seem to have suffered no marked damage even though they were under water for a considerable period of time. Some of the lateral branches were killed, but new branches from dormant buds have taken their place.

Owing to the damage from forest fires which occurred so generally in 1924 it was difficult to find areas on which to observe damage by flood only. Three separate areas showing little or no signs of fire were found in Madison Parish and were closely studied. Survey strips were run through each of these areas and detailed records were taken to determine the extent of flood damage. The flood water remained on these areas for about three months. The depth of the water ranged from 8 to 20 feet and the proportion of trees killed varied accordingly.

Of the 458 trees examined on these areas 60 per cent had been killed. All the trees that were entirely covered by flood waters were killed and the less thrifty trees that were partially covered also died. In the case of the ash, gum, and elm the roots as well as the main stem were dead, but the hickory and occasionally an oak have sent out sprouts from dormant buds. These sprouts could hardly be called thrifty, and it is doubtful if they will produce thrifty trees.

The combined effect of the flood and the 1924 fires has left most of the hardwood lands with very little growth under 10 years of age.

A Possible Means of Larch Sawfly Control

By Samuel A. Graham, United States Bureau of Entomology

Finding a means of protecting tamarack from the ravages of the larch sawfly is one of the most urgent entomological problems in the Lake States. In the vast areas of swamp forest in that region the future of tamarack in any forest management plan would be assured if it were not for the continued menace of a sawfly outbreak; for tamarack grows more rapidly and reproduces itself more easily than any other swamp tree.

The University of Minnesota undertook the study of the sawfly many years ago. The Bureau of Entomology joined in the work in 1923, the University of Michigan six months ago. These studies are beginning to bear fruit and it is now possible to make some practical suggestions for the control of the pest.

Experiments with cocoons placed in a tamarack swamp on the surface of a sphagnum hummock and in sphagnum moss 2 inches below the surface, and on high ground on the surface of tamarack needle litter, beneath the litter, and buried in sand, indicate that the best of these locations for sawfly hibernation is below the surface of sphagnum moss, where from 32 to 61 per cent emergence occurred. On high ground there was either no emergence or a very low emergence, except in one case in which 29 per cent emergence occurred from cocoons buried 1½ inches in sand. Since in nature the cocoons are seldom found buried in mineral soil, this exception has little significance. These data indicate that on high ground the larch sawfly may not be such a serious menace to the tamarack as it is in the swamp. They also suggest the possibility of so treating the swamp forest by drainage or flooding that hibernating conditions for the sawfly may be made less favorable.

The importance of biotic factors in the control of the larch sawfly has been recognized for many years, but the results of experiments in the Lake States indicate that our ideas of the relative importance of insect parasites, diseases, and small vertebrates must be somewhat modified. We have usually thought of the insect parasites as being the most important factor and the vertebrates as being the least important in reducing the number of sawflies while the insects are in the cocoon. Our observations indicate that the percentage of cocooned sawflies killed by parasites is seldom more than 15 per cent and is as a rule nearer 5 per cent, and that those killed by disease run from 3 to 10 per cent. Those eaten by mice, however, run on the average from 50 to 80 per cent.

Our experiments have also shown that in places where the ground cover is most varied and food for mice is most abundant the percentage of cocoons opened by mice is likewise larger. On the high ground where the mouse population is apparently still more dense than in the swamps it is often impossible to find a single cocoon that has been opened by the normal emergence of the sawfly.

All these facts suggest the possibility of protecting tamarack forests from the attack of the sawfly by improving conditions for the mice, and thus increasing the effectiveness of these animals as a control agency.

From the results of the experiments it is evident that superficial drainage of tamarack swamps offers a possible means of reducing the probability of larch sawfly outbreaks. Disregarding the fact that such treatment would probably stimulate growth and thus make the trees more resistant to the effects of defoliation, there are two ways in which sawfly abundance is likely to be affected by drainage. In the first place the surface character of the soil may be changed so that it becomes less favorable for sawfly hibernation. In the second place it is doubtless a fact that in drained swamps the character of the ground cover will be much modified and will become more diversified. Such a change would mean more favorable food conditions for the rodent population and greater effectiveness in sawfly control by these animals.

The Rôle of Microorganisms in the Transformation of Organic Matter in Forest Soils

[From paper given by S. A. WAKSMAN, Rutgers University, at the December, 1927, meeting of the American Association for the Advancement of Science]

A detailed study has been made by the New Jersey Agricultural Experiment Station of the chemical nature of the organic matter in forest soils and of the decomposition of oak leaves under aerobic and anaerobic conditions by microorganisms. The plant residues added to the soil in the form of various tree products such as leaves, needles, twigs, and fruits consist of a number of organic complexes including various celluloses, hemicelluloses, lignins, resins, tannins, and nitrogenous and other constituents. In the decomposition of these various constituents a number of organisms take an active part. Some of these organisms attack primarily the water soluble substances; others can decompose readily the celluloses and hemicelluloses; while still others, largely Basidiomycetes, are capable of attacking the lignins. The decomposition which leads to the formation of the so-called forest humus is considerably influenced in rapidity and kind by the reaction of the soil and the presence of available nitrogen.

Green oak leaves tested in the laboratory after six months under aerobic conditions showed the following changes. More than half the organic material had disappeared. Water soluble organic matter amounting to 44.04 grams in the original leaves was reduced to 10.52 grams; hemicelluloses from 25 to 6.62 grams; celluloses from 31.84 to 6.01 grams; lignins from 41.34 to 38.20 grams; crude proteins from 18.36 to 9.37 grams; and the ether soluble portion from 9.5 to 2.31 grams. After a year of decomposition less than one-third of the organic matter was left. Under anaerobic conditions the decomposition was considerably slower. Under such conditions the celluloses and hemicelluloses, the ether-soluble substances, and the lignins decompose more slowly. The water-soluble matter, however, decomposes as rapidly under anaerobic as under aerobic conditions.

A detailed study was made of the chemical composition of the humus of three forest soils taken at Mount Desert Island, Me., including a hardwood spruce forest, a mixed coniferous and deciduous forest, and a spruce forest with a growth of hypnum moss, and the composition of this humus was compared with that of the humus formed under controlled laboratory conditions. The comparison brought out definitely the similarity of the processes of formation of organic matter in nature and in the laboratory from the same or similar plant products. The difference in the composition of the original material, in the environmental conditions under which decomposition of the natural organic materials took place, and in the microorganisms which brought about the decomposition processes, no doubt account for the slight difference in the resultant humus.

The results of these studies indicate that the humus is made up of (1) a number of the residual constituents, such as the celluloses, hemicelluloses, fats, and waxes of the various plant products (leaves, twigs, roots, mosses, etc.) which are undergoing decomposition; (2) the constituents of the plant products which are more or less resistant to decomposition, such as the lignins, cutins, tannins, and resins; (3) the microbial cells (fungus mycelium, spores, bacterial cells, protozoa, worms, etc.) synthesized in the process of decomposition of the natural organic materials continuously added to the soil; and (4) the products of decomposition of the natural materials and cell products, such as organic and inorganic acids and ammonia.

Methods have been developed which allow us to make careful analyses of the chemical composition of the organic matter in forest soils and to compare this composition with that of the plant remains which have given rise to this "humus." The use of alkalies for extracting the various "humic acids" from the soil is undesirable, since this method does not bring out the nature of the organic complexes in the soil.

Scale Formula Gives Scribner Decimal C Results

A formula giving results practically identical with those of the Scribner Decimal C scale rule has been developed by C. E. Knouf, of the Weyerhaeuser Scaling Bureau, as follows: Square the average diameter of the top end of the log inside bark, subtract from this product the average diameter multiplied by 3, multiply the remainder by one-half the length, and point off the right-hand figure. Algebraically expressed, the formula is $\frac{(D^2-3D)\ \frac{1}{2}L}{10}$. For a log 20 inches in average diameter and 16 feet long this formula gives the contents as 272 feet. The Scribner scale gives 280 feet.

An Experiment in Insect Control in Western Yellow Pine Line Slash

By Hubert L. Person, United States Bureau of Entomology

How the control of injurious forest insects is affected by different methods of disposing of "line" slash of western yellow pine, cut in clearings for power lines, roads, etc., is suggested by the results of an experiment recently carried out by the writer. This question is one of a number of entomological problems in connection with the disposal of slash of this species still requiring solution, although it has been fairly well established that, in general, western yellow pine slash is not a serious menace as a breeding ground for primary forest insects. This work, in which the California Forest Experiment Station cooperated, was undertaken primarily to determine how far the Forest Service should go in its demands for treatment of line slash cut on national forests by California power companies. The experiment was limited to trees cut in the lower western yellow pine belt of California during April and May.

The felled trees were attacked during the first season by four insects or insect groups: the western pine beetle (*Dendroctonus brevicomis*); the confused engraver beetle (*Ips confusus*, Lec.); flat-headed borers, principally Melanophila spp.; and roundheaded borers, principally Graphisurus spectabilis, Lec. Of these the western pine beetle is the only typically primary forest insect. The confused engraver beetle, which is occasionally primary, is the only other insect considered in the study.

The five methods of disposal tried, and the results from each, are as follows:

I. The trees were felled only, the limbs and bark being left intact. The western pine beetle attacked 25 per cent of the total bark area. The brood development of this insect was greater than in any of the other slash groups, but much less than in standing trees. The number of western pine beetles that emerged exceeded the number that attacked by 2.6 per square foot of bark surface.

II. The trees were felled and the limbs all cleared away, leaving the trunk exposed. The western pine beetle attacked 30 per cent of the bark area, and the engraver beetle attacked 8 per cent. The number of western pine beetles that emerged was less than the number that attacked by 10.5 per square foot.

III. The trees were felled and limbed and the trunks were covered with brush. The western pine beetle attacked 38 per cent of the bark area. The brood development was greater than in Group II but less than in Group I. The number of western pine beetles that emerged was less than the number that attacked by 6.6 per square foot. On 28 per cent of the bark area a fairly large engraver beetle brood developed.

IV. The trees were felled, limbed, covered with brush, and burned within two weeks. The fire scorched 32 per cent of the inner bark area. Most of the remainder of the area was unfavorable for bark beetle development. The western pine beetle attacked 4 per cent of the bark area, and the engraver beetle attacked 6 per cent. The number of western pine beetles that emerged was less than the number that attacked by 3 per square foot.

V. The trees were treated in two ways. Four trees were felled and limbed and the lower half of the trunks covered with brush. The upper half was left exposed. Two trees were felled and limbed and the lower half covered with brush and burned. The burned and exposed parts had very little bark beetle work, and the covered parts were too moist for good brood development. The western pine beetle attacked 22 per cent of the bark area, and on 33 per cent of the bark area a fair brood of the engraver beetle developed. The number of western pine beetles that emerged was less than the number that attacked by 9 per square foot.

The following table permits comparison of the numbers of western pine beetles attacking and emerging, for the different slash groups and for normal standing trees killed by the beetle during the period of the study:

The relation of attack to emergence of the western pine beetle; normal standing trees and five slash groups

	Number of individuals of the western pine beetle per square foot		Increase or decrease per square foot	
	Attacking	Emerging	Number	Per cent
Standing trees	27	81	+54	+200
Slash:				
I. Felled only	17.7	20.3	+2.6	+15
II. Felled and limbed	13	2.5	−10.5	−81
III. Limbed and covered	12.4	5.8	−6.6	−52
IV. Limbed and burned	8	5	−3	−37
V. Given mixed treatment	9	0	−9	−100

It is evident that the attack on slash did not cause any increase in the infestation. Even in the case of Group I, the trees that were felled only, the increase in effective progeny of 2.6 per square foot would probably be more than offset by the mortality during flight. Apparently the survival in the broods of the beetles feeding on slash is so much lower than that from beetles feeding on standing trees that the effects of an attack upon line slash must be toward a decrease rather than an increase of the total infestation.

For most situations in the lower western yellow pine belt it is recommended that either method II or method IV be used. These two methods result in high mortality in broods of the western pine beetle combined with small percentages of area attacked by the engraver beetle (8 per cent and 6 per cent, respectively), and so tend to improve the forest insect situation in an area rather than create a menace. Method II, in which the trees are felled and limbed only, should be used whenever burning of the slash can not be completed within a month from the time the trees are felled (i. e., before

the broods have a chance to develop and emerge). It is most effective on open sites where the logs can be exposed to full sunlight. Method IV, in which the trees are felled and limbed and the brush is burned over the trunks, is the surest method when the burning can be completed within a month after the trees are felled, especially on north slopes and in shaded situations where the logs can not be exposed to direct sunlight.

An Economic Study of Land Use in West Virginia

The interest of various Federal and State agencies in the problem of planning for efficient use of lands that are now idle or are being used unwisely is exemplified by a survey now being made in the mountains of southeastern West Virginia by the United States Bureau of Agricultural Economics, in cooperation with the West Viriginia Agricultural Experiment Station and the United States Forest Service. In that region, which has been settled for 100 years or more, agriculture has always been of the self-sufficing type. During the last half century it has been closely linked with forest industries, which furnished employment and cash income. The bulk of the timber has now been cut, and what is left can not last long. Farming no longer pays, on much of the land, and many fields are being abandoned, while at the same time the burden of carrying cut-over land is pressing heavily on the owners. The problem of future land utilization in the region is, therefore, of urgent interest from both the private and the public standpoint.

The forester's task is to determine the economic practicability of utilizing various types of land for forestry, either by private owners or by public agencies, and in cooperation with agricultural economists to ascertain the relative values of different sorts of land for agriculture and forestry, under existing economic conditions or those likely to prevail in the near future. It is hoped that the study will lead to the formulation of a program for coordinated, permanent agricultural and forestry utilization of lands in the region.

The collecting of the necessary physical and economic data was begun last summer, and will be completed this year. Information is being gathered from farmers, landowners, and various wood-using industries. Detailed data on composition, growth, condition, and ownership of the forests is being obtained chiefly by means of sample plots scattered throughout Nicholas and Webster Counties on various soil and land types. Inquiry is also made into the local methods of taxation and the amount of tax burden on both farms and forests, in order to ascertain the effect of taxation on land utilization.

This study is probably the forerunner of a number of similar projects to be undertaken later in other portions of the country where there are large areas of unutilized land.

A Suggestion for the Use of Tables of Basal Areas

By Donald Bruce, United States Forest Service

Anyone who has occasion to make frequent use of a table of basal areas will find it profitable to enter this table on his slide rule. Slide rules may be purchased that have two of the scales blank and that are, therefore, particularly convenient for this purpose; however, room can ordinarily be found on almost any pattern.

All that is necessary is to scratch a series of graduations on the outer edge of the rule opposite the basal area values taken from a basal area table, and number each with the corresponding diameter. Values from 1 to 10 are all that are needed (if $\frac{1}{10}$-inch intervals are used), for 11 and 1.1 are the same except for a shift of the decimal point. In many rules, however, the resulting series of graduations will be double the length of the rule, so that it will be necessary to use two edges to complete it. The precise details of the arrangement vary so widely with the type of rule used that it is impracticable to explain them explicitly. It is advisable to work the arrangement out in pencil and not scratch in the graduations until the most convenient layout has been found.

In use, the end of the slide may be set opposite the graduation for any desired diameter by using the runner. The rule is then in position for multiplying, and the total basal area for any number of trees of that diameter, or the volume of a cylinder having any given length, can be read in the usual way as a product. The position of the decimal point can be supplied by inspection.

Transplants Treated With Compressed Air

Compressed air forced in among the roots of large trees that have been transplanted is found to assist the trees in recovering from the operation. This treatment has been tried out by a commercial firm of Cleveland, Ohio. It was suggested to them by botanists of the Ohio Agricultural Experiment Station, on the theory that difficulty in getting large trees to survive transplanting is due to suffocation of the roots. The air is supplied through a nozzle so designed that it can be forced deep into the soil. The treatment effects an almost immediate revival of trees that have not shown a vigorous recovery after transplanting. It has also proved stimulating to trees on lawns, where, apparently, the roots of the densely matted grasses making up the sod sometimes release so much carbon dioxide in respiration that the supply of oxygen in the soil is dangerously reduced. It could possibly be extended to street trees, which suffer greatly from the leaking of gas mains and from soil compactness due to paving.

Snakes and Snake Bites

By Will C. Barnes, United States Forest Service

Forest officers, cowboys, sheep herders, and others constantly "out in the open" generally become accustomed to the thought that reptiles are part and parcel of our forest population and, with very few exceptions, are absolutely harmless and quite as interesting in their ways as any of the other wild things of the woods. Many persons unaccustomed to camping out, however, consider it absolutely necessary to carry around with them every available means of protection against the attacks of reptiles that mean them no real harm and for the most part ask only to be let alone. The whole snake family is paying the penalty for the single act of one ancestor. It was the serpent that got our original parents into trouble and sent them in disgrace out of the Garden of Eden. Ergo, everyone takes it out on snakes, whether it be the pretty and absolutely harmless little garter snake or the huge, surly, quick-tempered, diamond-backed rattler of the Florida swamps.

First and foremost among snakes comes, of course, the rattler. We have three other poisonous snakes, the moccasin, the copperhead, and the coral snake; but their habitat covers a comparatively limited area of the United States, while the rattler, according to Dittmars, is found from the Gulf to the Canadian boundary and from the Atlantic to the Pacific. Only in Maine and New Hampshire is he absent. He seems to be quite as much at home in Montana as in Florida. He enjoys the desert air of southern Arizona as well as the humid climate of the South Atlantic coast. You will find him below sea level in the Death Valley country of California and again high above timber line all over the Rockies.

No census figures show the number of rattlesnakes in our country, but there are plenty of them in every region. When you consider that our national forests were visited last year by more than 10,000,000 people, a large majority of whom camped out and tramped over the country fishing, hunting, picking wild flowers, taking pictures, and exploring every reachable nook and corner of these vast areas, the number of persons attacked by these reptiles seems practically negligible. And the fatalities on the national forests from this cause can probably be counted on the fingers of one hand.

Figures as to numbers of persons bitten by rattlesnakes are not complete. The Texas State Journal of Medicine records that in 1926 there were 150 deaths in the entire United States from this cause, of which 17 occurred in Texas. In that State, in 1926, 60 persons bitten by rattlesnakes were examined and studied. Nine of the 60 died. On that basis probably about 1,600 persons were bitten in 1926 in the whole country—not a large number out of a population of more than 120,000,000.

The effect of a rattler's venom is to coagulate the blood and slow down its circulation. If the poison does not get into the venous system no harm results. This is why hogs are never killed by rattlers. Their venous system is protected by a thick layer of fat through which the poison does not penetrate. This is also the reason why many persons struck by rattlers do not die or suffer any serious harm—the venom does not reach a vein.

Up to a comparatively short time ago alcohol was considered the one remedy for the bite of a rattler. So when planning outings everybody provided plenty of whisky. Then scientists discovered that in a case of rattlesnake bite the action of whisky in stimulating the circulation was about the worst thing that could happen—the poison was the more rapidly carried into the venous system. So whisky as an antidote for rattlesnake bites was declared taboo.

About that time some chemist started the idea of using permanganate of potassium, and for the last 15 or 20 years this has been the approved remedy. Kits for its use have been sold everywhere and thousands of people, including forest rangers, are to-day carrying around these permanganate of potassium kits, firm in the belief that in this way they are fully protected against death from rattlers.

And here in the last year or two come a new bunch of scientists who tell us we are all wrong and that permanganate is useless as a protection and positively injurious to the patient. They say that the permanganate causes a sloughing away of the flesh around the spot where it is injected, resulting in serious sores that cause the patient severe suffering.

The latest and most successful method of counteracting the effects of snake venom is the use of antivenin, or antisnake-bite serum, a concentrated serum derived from horses that have been dosed with venom from rattlesnakes. This is the result of years of investigation by Brazilian Government officials who have made most detailed studies of this matter. It is issued under license from the United States Public Health Service, in small convenient packets with syringe and full instructions. The results of hundreds of experiments on both humans and animals, carried out under the direction of the Antivenin Institute of America, seem to prove conclusively the value of this latest method. During 1927 an experiment station located at San Antonio, Tex., was unusually successful in demonstrating its value in a large number of cases of persons bitten by rattlers. In December, 1927, the Surgeon General of the United States advised the Forest Service as follows:

> A very interesting article on first-aid treatment for snake bites will be found in the Texas State Journal of Medicine for July, 1927. This article we believe pretty well disposes of the contention that permanganate of potassium is of value in the treatment of snake bite. * * * It is believed that it would be of distinctly more value to make incisions at the site of the wound made by the bite of the serpent and to apply suction either mechanically or by the mouth. With regard to antivenin, there is experimental evidence that it is of value—just how much value under clinical conditions one could not say. * * * The material is readily applied by any intelligent person.

By mechanical suction is meant the use of small affairs called breast pumps, which are readily obtained

at any drug store and doubtless make a better job of the withdrawal of the venom than the mouth, without the danger to the person whose mouth is being used.

And so permanganate of potassium follows whisky into the closed files and its place is taken by this new antivenin.

How a Virginia Farmer Handled His Woodland

By Gordon Furr, United States Forest Service

In 1920 a friend of mine bought a small farm of 47 acres in Fairfax County, Va., 6 miles southwest of Alexandria. There are 22 acres of cleared land and 25 of white oak, pine, and poplar timber with a few locust trees. In 1921 he cut 60 cords of the oak and pine for fuel wood at a cost of $1.50 per cord. The market price of this wood, delivered at the side of the road, was $11.50 per cord. After all had been sold he figured he had made a clear profit close to $600 and had spent most of his time either taking orders or doing other things about the place.

The following year he had 100 cords more cut, at $2 per cord, which he sold to a Washington firm for $11.50 per cord. This time he didn't have to take orders, it seemed as though dealers everywhere wanted the wood. After selling he again took his pencil and figured his profit to be around $900.

The last time I was out there I took a look at the woodlands. There is a good growth of young timber and I am sure in a few years it will look as if no great amount had been cut.

When this man purchased his farm he did not count on his wood, but rather on trucking and chickens. After rather bad luck with an acre of cantaloupes and everything else in the trucking line, he started to figure how he was going to meet his second payment. Thanks to the timber, within a year after he bought the farm he paid off one note and when the next one came due his best friend, the forest, had come to his rescue again. Last year a pulp mill in Georgetown, D. C., wanted to contract for the poplar, but I think he will wait for a little while before selling any more.

Pruning White Pine in Maine

In pruning white pine W. B. Deering, of Hollis Center, Me., gets good results with a 17-gauge steel saw blade about 18 inches long, 3 inches wide at one end and 2 inches at the other. There are 4 teeth to the inch, set so as to cut with a downward pull, and the saw blade is fastened to a 10-foot pole at an angle of 30°. Mr. Deering prunes only dead limbs from the 16-foot butt log. He states that with this tool a man can prune a tree in from 2 to 4 minutes, or about 100 running feet of tree trunk in an hour. This means a rate of about seven 16-foot logs per hour and a cost of about 8 cents per tree.

Long-Bell Co. Gathers Pine Seed for Planting

In preparation for this spring's sowing the Long-Bell Lumber Co.'s forces at De Ridder, La., gathered 12,000 pounds of pine cones—8,000 of longleaf, 3,000 of loblolly, and 1,000 of shortleaf pine. When dried in a lumber shed in the Ludington mill the cones yielded clean seed in the proportion of 3 pounds of seed from 100 pounds of green cones. It was planned to sow these seed in 200 beds, 12 by 24 feet, from which the company's foresters hope in 9 or 10 months to transplant 1,000,000 seedlings.

For field planting this spring the company had ready in its De Ridder nursery 15,000 loblolly pines. Supplementing these with stock from the State nursery, it planned to plant 150 acres. The quota at which the company aims in 1929 and succeeding years is 1,000 acres. The company had previously established two plantations in the neighborhood of De Ridder, one made in 1926–27 and one several years older in which the trees are now from 4 to 10 feet high.

Several thousand seedlings of Pacific coast species are being grown by the company for experimental planting in Louisiana. These include redwood, Port Orford cedar, and Douglas fir.

Arkansas Citizens Volunteer to Protect Ouachita National Forest

Appreciative neighbors of the Ouachita National Forest, Ark., have voluntarily organized to give it free protection from fire. Citizens of Sugar Grove, Ark., at a meeting held March 3 formed a forest protective association primarily for the purpose of preventing and supressing forest fires near and on the Ouachita National Forest. The agreement to fight fires without charge was signed by 72 men, who were organized into four groups headed by "Ouachita National Forest fire wardens."

A 3,000-acre fire in the strawberry belt of southeastern Louisiana, occurring late in January, caused considerable losses by destroying large quantities of pine "straw" in the woods. Huge quantities of pine straw are used every year as a protective covering for the strawberry beds. Loblolly pine straw is used in preference to that of longleaf pine because it rots quickly and practically disappears by the end of the summer. Wood-lot owners in this section sell their yearly fall of needles at prices ranging from $3 to $7 per acre and averaging about $4. Their woods are kept remarkably clean, all hardwood brush, fallen branches, and other débris being gathered in piles before the straw is raked together to be carried to the fields.

Wisconsin Commercial Forestry Conference

The speeches and floor discussions at the Wisconsin Commercial Forestry Conference, held at Milwaukee, March 28–29, indicated that the time is ripe for placing forestry on a much sounder footing in the State. Many influences distinctly favorable to forestry in the State manifested themselves and the desirability of forestry activity by the counties, the State, and the Federal Government was recognized.

A more general application of the forest crop law was regarded by the conference as a desirable thing. At the time of the conference 65,000 acres had been listed under the law and applications known to be pending amounted to about 200,000 acres. Extension of the economic survey over the forested area of the State was advocated. This would provide a basis for determining the best economic use of such lands. Stress was laid on the desirability of reforestation and of getting technical advice on management. Governor Zimmerman in his address expressed the hope that ultimately Wisconsin would own two or three million acres of State forest.

The conference brought out the fact that a change has taken place in the feeling in the State with regard to the use to which cut-over lands can be put. There appears to be a growing and rather general recognition of the fact that a great deal of the land in the State is not suited for agricultural use and that attempts to colonize it result in economic losses. The recognition of this fact paves the way for a sound program of land economics that will include forestry as a major activity. Great interest was manifested in the recreational value of forests and in their importance in the perpetuation of wild life. It was stated that recreational activities in the State bring in a revenue averaging about $100,000,000 a year.

The conference program was arranged to cover discussions of the land and forest situation in Wisconsin, what forests mean to the public and the various industries, fire protection, forest utilization, forest taxation, reforestation, farm timberlot forestry, and the part to be played by public and private agencies in handling the forest lands of the State.

White Pine Blister Rust Regulations Modified

Because of the spread of the white pine blister rust in the Pacific Northwest, changes made in the quarantine regulations add Idaho to the list of States designated as infected and the counties of Clackamas, Hood River, Multnomah, and Wasco to the territory in Oregon to which special restrictions apply. Details of the changes are given in "Amendment No. 1 to Revised Rules and Regulations Supplemental to Notice of Quarantine No. 63," issued by the Federal Horticultural Board.

Cigar and Cigarette Fire Hazard

In an article in the January number of the Quarterly of the National Fire Protection Association, P. D. Sale and F. M. Hoffheins, of the United States Bureau of Standards, give the results of fire-hazard tests made with 9 brands of cigarettes and 11 brands of cigars. The tests were made by placing the lighted cigar or cigarette butt in a dry grass pad attached to a screen. Some tests were made in still air; others with wind of various velocities generated by a small electric fan. The tests were made with grass pads of various densities, from 0.032 to 0.099 gram per cubic centimeter. From measurements of butts found on concrete floors, pavements, and bare ground where, according to the experimenters, the thrown butts usually go out without further burning, it was estimated that the average cigarette butt is about 1¼ inches long; so half-length cigarettes were lighted and burned down to 1¼ inches for use in these tests. Cigar lengths used in the tests ranged from the whole to any length sufficient for relighting and testing.

In 50 tests each with cigars and cigarettes in still air no ignition of the grass pads took place. In 17 cigarette tests in a wind of 1 to 3 miles per hour the ignitions amounted to 41.2 per cent; in 95 tests in a 3 to 4 mile wind ignitions were 85.3 per cent; in 63 tests in a 4 to 5 mile wind, 50.8 per cent; and in 26 tests in a 5 to 8 mile wind, 57.7 per cent. In 54 cigar tests in a 1 to 3 mile wind the ignitions were 18.5 per cent; in 37 tests in a 3 to 4 mile wind, 8.1 per cent; in 63 tests in a 4 to 5 mile wind 25.4 per cent. With higher wind velocities the ignitions increased to 39.3 per cent in 84 tests in a 9 to 12 mile wind, which was the highest in all the tests that were made. Cigarettes took from 19.2 to 33.5 minutes to burn their full length; cigars from 2.3 to 5.17 minutes. The average time the 1¼-inch test pieces of cigarettes took to ignite the pads was 9 minutes 33 seconds in a 1 to 3 mile wind, 4:47 in a 3 to 4 mile wind, 5:39 in a 4 to 5 mile wind, and 4:48 in a 5 to 8 mile wind. The cigars took on the average for the various wind velocities and lengths all the way from 1 minute 18 seconds to 4 minutes and 28 seconds.

Since the national consumption of cigarettes is now near 90,000,000,000 and that of cigars 7,000,000,000 a year, and since the percentage of ignitions for cigarettes is about three times that for cigars, the relative potential hazard is about 40 to 1. In either case the hazard is large; for with air currents "of proper intensity" ignitions were consistently obtained in over 90 per cent of the trials with plain cigarettes and in from 10 to 40 per cent of the trials with cigars.

Tests made with cigarettes having tips of cork, added cigarette paper, or writing paper showed the hazard to be reduced on the average to 50 per cent by the use of ½-inch tips, to 20 per cent by ¾-inch tips, and to less than 10 per cent by 1-inch tips.

Foreign Notes

What a German Forester Can Learn in America

By H. F. von Maltzahn, Mecklenburg States Service

"What can a German forester learn in America?" This was the most frequent question the writer had to answer while traveling through the United States and Canada.

Let's take it another way around: What do we European foresters *want* to learn, when we come to America?

We are not looking for applied silviculture. Even if we were, I only need to mention one word: Petersham! Some Europeans may be especially interested in your American technical development, in the tools, machinery, and methods you use in nurseries, sawmills, and logging operations; and their visit will be worth while as long as they remember that different trees require different logging tools and different conditions different methods. Others may come and study your forest research work. Visiting your forest experiment stations they will see that the problems handled there are very often far ahead of the present practice of forestry in America. Too far ahead? I do not believe so. No seed will germinate if the soil is not in suitable condition. The point is that the rich American forestry soil is hard and needs preparing. Experimental work is soils work, and soil science is a main foundation of silviculture. The ecological and meteorological work done by the United States forest experiment stations will be of interest and value to every visiting European forester.

But it is more still that we are looking for in America: The greatest and most instructive textbook for a forester is Nature herself. In the "old country" we have an old forestry. Through a great period of time silvicultural methods tended toward production of pure and even-aged stands of the tree species most promising financially. The natural plant associations of our forests were changed or killed, the forest soils damaged, and their virgin condition, favorable to a natural reproduction of tree growth, got spoiled. Rather late we recognize the damage that has been done. But perhaps not too late. And so we are looking for other parts of the world with comparable conditions of climate and soil where Nature is nearer to her virgin state, in order to learn how she grows forests. Well, but America? With its fire hazard, its grazing problem, its killing methods of clear-cut logging? All this is true. But after the logging nature does the seeding, replacing aspen and birch, pines and pencil cedar on old forest land of other species. After the fire nature takes care of reforestation, converting a spruce-fir forest into lodgepole pine, or a Norway pine stand into jack pine. And still large areas of virgin forest remain where the local replacement of a Douglas fir generation by western hemlock, of a lodgepole pine generation by Douglas fir, is only the result of nature's work, or where the different hardwood mixture types naturally keep their abundance of species and forms. Should we foresters not look into Nature's power plant as deep as possible before we try to correct her methods? I believe that we can learn from her and that the opportunity to do so is here in America.

After all this talk about what we European foresters can learn here, I suppose you Americans now want to hear what we did learn during our visit to your country. Well, give us a chance to show you that instead of talking about it. Visit us in the old country. Perhaps you will see then that we did learn another thing here (if we had need to learn it)—hospitality among foresters.

Irish Free State Forestry

State forestry in Ireland began in 1905, and in spite of various upsets due to politics and war, has continued to the present. Some 35,000 acres have been acquired, of which 24,000 were bare land needing planting and 4,000 were in timber. Over 13,000 acres have been planted and excellent progress is being made, about 2,500 acres being planted each year. Most attention has been given to conifers, chiefly exotics, which for the most part have done very well. About 27 per cent of the plantings have been Sitka spruce, 23 per cent Scotch pine, 19 per cent Douglas fir, 14 per cent Corsican pine, 9 per cent European larch, and 6 per cent Japanese larch. Douglas fir, Sitka spruce, and lowland white fir have made the most rapid growth, followed by the Japanese larch. On exposed areas, lodgepole pine and the Rocky Mountain form of the Douglas fir have done well. These and the mountain pine (*Pinus montana*) are being planted for windbreaks and shelter belts.

Nursery stock is distributed free to local authorities, and to private forest landowners and farmers. Public institutions and bodies are encouraged to establish nurseries, and for each acre of such nurseries the State contributes £100. Assistance is provisional upon compliance with requirements.

The Irish land act of 1909 provides that the consent of the forestry department shall be obtained prior to cutting on vested holdings. This has resulted in preventing heavy cuttings and in preventing cuttings without reference to the maintenance of the forest.

Rain and the Forest

A study made in South Africa by Dr. John Phillips at the Deepwells Forest Research Station indicates that the Knysna forests of Podocarpus and Olea perform an important function in intercepting and depositing the moisture of fine mist rains. During one season studied, 79 per cent of the rains were of this character. Rain gauges were set out in the forest and on the level ridge of an exposed hill at an elevation of 1,725 feet. The gauge screened by the forest received 94.56 inches of rain, while that in the open received 52.02 inches. Even the "macchia" (chaparral) is responsible for the deposition of an appreciable amount of moisture. In times of light rains less water was caught under the forest canopy than in the open, because of the interception of considerable moisture by the leaves, stems, and branches, and of its subsequent evaporation.

During fine mists the forests are usually dripping wet while the ground immediately beyond their margin is comparatively dry. This same phenomenon has been noted in other parts of South Africa, as in the Transvaal and in Natal, where the evergreen rain forest is coincident with a relatively narrow zone over which heavy mists occur frequently during the dry season. Doctor Phillips believes that his studies strengthen the view that this mist-belt forest is able to stand the long winter drought because of its ability to condense the moisture upon its crowns.

A Study of Forest Fauna and Forest Litter

A study of the fauna of forest litter was carried out by Dr. Stepan Soudek, of the University of Brunn, Czechoslovakia, by taking a sample of soil from a red spruce forest once each month for a year and counting the little animals contained in it. An approximate estimate was made of the number of Collembola and Acarina, which were present in great abundance. Other animals were counted singly. It was found that these creatures do not die in the fall but survive even in the frozen soil. Doctor Soudek's observations led to the conclusion that the entire quantity of organic litter in the forest is transformed in 20 years by passing through the digestive systems of the edaphic fauna.

The forest service of Java, which was organized 80 years ago, has at Buitenzorg an experiment station for the study of methods of exploitation of the forests, renewal of the teak forests, forest economics, protection against insects and diseases, properties of woods, etc. Java has more than 700,000 hectares of teak forests.

The membership of the Canadian Forestry Association has grown from 2,000 in 1914 to 29,000 in 1927. The association held 1,604 public meetings in 1927, reaching rural audiences totaling 304,481.

Palestine Sand-Dune Reclamation

Investigations into sand-dune reclamation have been in progress at the Acre-Haifa Forest Experiment Station of the Palestine Government since 1921. The results of this work have now reached a stage at which success seems certain—so certain, in fact, that a development company plans to take over the work for the whole dune area under a long-term lease. The plantations of the experiment station so far cover more than 200 acres.

Plank fencing was used in the early work on the fore dune but was given up in favor of brushwood, which produced more prompt results and proved to be less expensive. Ammophila grass was planted according to several methods, that of planting in horizontal rows along the contour giving the best results. Fixation became marked even during the first season, and at about the end of the third year much of the blowing ceased. The interior dunes, also, were planted to Ammophila, supplemented with Artemesia monopherma, a small bush native to the dunes which is propagated by merely pulling plants to pieces and inserting them deeply in the sand. The Artemesia soon took root and developed a good cover.

Tests were made of various tree species. Tamarix articulata did well on the leeward side of the fore dune, but failed on the crest. In general it grew with disappointing slowness, probably owing to local climatic conditions. Eucalyptus rostrata did well on areas where it was not flooded and where the roots could reach a heavier soil. Other eucalypts did not give such good results. Pinus halepensis gave evidence of finding conditions favorable to success, but the Monterey and maritime pines failed. Of a number of other species commonly found on dunes or on sandy soils such as Dalbergia sissoo, Casuarina equisetifolia, Parkinsonia aculeata, Acacia longifolia, A. melanoxylon, A. mimosa, and A. cyanophylla, the last named did the best. Of more than 18,000 trees of this species planted in the 1925–26 season, 95 per cent survived. The tree is hardy and can be both top and root pruned. At the end of one year the trees were 3 feet high, and in three years they formed a dense thicket with a good leaf mulch on the soil. When some plantations 5 years old were cut for wood, the sprouts promptly reclaimed the area with a stand more dense than the original one. Direct seeding of this and a number of other species failed. At the Acre nursery little trouble was experienced in raising any of the species mentioned except Monterey pine, but the longleaf and Bishop pines failed to survive the first season of strong dry east winds.

During 1928 there will be felled in Prussian State forests 8,600,000 festmeters of timber, of which 2,700,000 festmeters will be hardwoods and 5,900,000 festmeters will be pine. The figures given out for 1927 were 2,600,000 festmeters of hardwoods and 5,500,000 of pine, altogether 8,100,000.

An Arboretum in Wales

The County Council of Denbighshire, Wales, in 1907 set aside 50 acres of rough, hilly pasture and moorland as the Ceiriog forestry experimental area. Plots of 1¼ acres each were laid out and between 1907 and 1914 were planted to various species to determine their fitness for North Wales.

Five species of larch were set out, three plots being given over to the European larch (*L. europaea*). The trees on one plot came from seed collected in Scotland, those on another from Germany, and those on a third from Austria-Hungary. The trees of Scottish origin were straighter, taller, and better in every way than those from the other sources, and apparently more free from the larch canker than trees from either of the other countries. The Austrian trees were poorer than the German. The Japanese larch (*L. leptolepis*) is more vigorous and 7 feet taller than the European, the stands denser, and the trees freer from canker. Mixed with Abies grandis, this larch in 19 years attained a height of 32 feet as against the 17 feet reached by the fir. Grown with Douglas fir, the larch held its own in the stand though some of the Douglas firs are now crowding it severely. A mixture with Corsican pine resulted in the early suppression and ultimate elimination of the pine, and a mixture with Sitka spruce resulted in the overtopping and suppression of the spruce, though because of its tolerance the spruce still survives. The American eastern larch, in pure stands, at first grew faster than the Japanese larch, but was later outstripped in height growth by the oriental tree. The American tree also was very susceptible to the canker. Similarly the larch from western America (*L. occidentalis*) was inferior to the Japanese tree, though better than its eastern relative and perhaps slightly less susceptible to canker injury. The Siberian larch (*L. siberica*) was of poor form and very slow growth, and was often severely damaged by frost.

Plots were planted to the so-called Fraser River variety of Douglas fir (*P. t. Caesia*), the Colorado variety (*P. t. glauca*), and the green variety (*P. t. viridis*). At 17 years the last named has a mean height of 25 feet, the Colorado fir 12 feet, and the Fraser River fir 17 feet. Douglas fir with Sitka spruce appeared to be a happy mixture, both growing at about the same rate.

The silver fir (*Abies pectinata*) was severely injured by the insect Dreyfusia Nusslini, and all the trees on one plot in which the silver fir and the Norway spruce were planted together were entirely killed by it. Of the Abies, the A. grandis grew at the fastest rate, the trees at 16 years being 18 feet tall, while at 19 years the silver fir was but 19 feet in height. Abies nobilis varied greatly in growth, for although at 16 years the average height of the trees in the stand was 12 feet, the tallest was 24 feet and the smallest 3½ feet. A. concolor at the same age had an average height of 11 feet. None of the American firs were attacked by aphids.

The Sitka spruce promises much for planting in pure stands at high elevations in Wales. At 19 years it was 24 feet high as against the 17 feet attained by the Norway spruce. The Serbian spruce (*Picea omorica*) is a slender tree and of slower growth than the Norway. Lawson cypress showed a tendency to multiple stem formation, and though averaging 13 feet at 16 years, is damaged by rabbits. Thuja plicata has grown at the rate of a foot a year and has grown well in mixture except under Douglas fir.

But few hardwoods were planted on the area, because of its elevation. Oak, ash, beech, Norway maple, and sycamore all were tried. The oak, stagnant at first, is picking up slowly, and the ash is not at all vigorous. The beech, which was planted with other hardwoods and with larch, has practically disappeared. Much of it was killed out by rabbits, which also killed the Norway maple.

Bringing Back a Forest in France

On the plateau of Millevaches, Departments of Creuse, Correze, and Haut-Vienne in south central France, 7,952 hectares of denuded forest land have been planted by the owners since 1913. In this work 8,691 kilograms of seed and 14,617,180 young trees were used. The expense to the Government, in subventions of money and cost of free planting stock, was 990,610 francs, or about 124 francs per hectare.

There remains 40,000 hectares of land on the plateau that needs to be planted. "Striking features of the plateau," according to Forest Inspector Miné, of Meymac, "are the small number of villages, their distance apart, their small importance, the small acreage of cultivated land, the poorness of the tree growth, and the enormous surface occupied by swamps and waste land. It has not always been so; farms and forests once occupied most of the land now abandoned. The deserted condition of the country is due solely to the emigration of the population to the big cities, especially Paris and Lyons, the emigration induced undoubtedly by the disappearance of the forest as a result of fire, land clearing, and clear cutting in order to facilitate sheep grazing. This emigration is in full swing now and it seems that there is no way to check it except reestablishing the forest."

Scotch pine is the species most used for planting. Seed are sowed on open sites, usually 4 kilograms to the hectare, in spring or fall, preferably in the rainy period in the spring. For planting 1–1 stock is used. The grass, heather, or other vegetation must be cleared away from the planting spots in advance. Trees are set 1.8 meters apart, or 3,000 to the hectare. After Scotch pine, spruce is most important. Three-year transplants of this species are used, spaced 2.25 meters apart or 2,000 to the hectare. Other species planted are larch, silver fir, maritime pine, white pine, Douglas fir, and Sitka spruce. Planting stock is provided by a Government nursery at Meymac with a capacity of 1,600,000 at a cost of about 22 francs per 1,000.

Personals

Raphael Zon, director of the Lake States Forest Experiment Station, has retired as editor of the Journal of Forestry. Mr. Zon has been connected with American periodical forestry literature ever since its inception in 1902, when the Forestry Quarterly was first published. In 1905 he became editor of the Proceedings of the Society of American Foresters, and he has edited the Journal of Forestry continuously since it was formed by the amalgamation of the Quarterly and the Proceedings. In the editorship of the Journal Mr. Zon is succeeded by Samuel T. Dana, dean of the Michigan School of Forestry and Conservation.

Charles A. Scott has entered upon the duties of extension forester with the Colorado Agricultural College, succeeding Chester A. Lee, who resigned to go into commercial work. Mr. Scott has been engaged in commercial nursery work in Kansas and Florida since 1917, when he completed seven years' service as State forester of Kansas. His earlier work was with the United States Forest Service and with the faculty of the Iowa State College. While in the Federal service he developed the Bessey Forest Nursery at Halsey, Nebr., and did the first large-scale tree planting on the Nebraska sandhills.

J. G. Peters has been appointed chief of the branch of public relations of the United States Forest Service, succeeding R. Y. Stuart, now chief of the service. Mr. Peters's work throughout 25 years' connection with the Forest Service has been in the field of State and private cooperation, and since 1910 he has had charge of the service's activities in cooperation with the States. A. B. Hastings, who has for several years assisted Mr. Peters as chief inspector of cooperative work under the Clarke-McNary law, succeeds him as chief of the division of State cooperation. Mr. Hastings's previous experience, in addition to 5 years as a national forest officer, included 7 years as assistant State forester of Virginia and 3 years as assistant State forester of New Hampshire. Both men are graduates of the Yale Forest School, and Mr. Hastings is president of the Yale Forest School Alumni Association.

Lyle F. Watts, administrative assistant in forest management in the Ogden, Utah, district office of the United States Forest Service, resigned May 1 to become head of the forestry department of the Utah Agricultural College. Mr. Watts is a forestry graduate of the Iowa Agricultural College and has had many years' experience in the Forest Service. His successor is Earl C. Sanford, supervisor of the Caribou National Forest, Idaho, who in turn is succeeded by Frank S. Moore, assistant supervisor of the Payette National Forest, Idaho.

G. H. Collingwood on June 1 becomes forester for the American Forestry Association, succeeding Shirley W. Allen, now of the faculty of the Michigan School of Forestry and Conservation. In this position he will direct general educational work in forestry, cooperat. with various agencies and with timberland owners in promoting forestry interest, and work for remedial forestry legislation. Mr. Collingwood received his education at the Michigan State Agricultural College, the University of Michigan, and the University of Munich, Germany. For the past five years he has headed the forestry work of the United States Extension Service. His early experience was in work on the national forests, and for seven years he taught forestry at Cornell University.

H. R. Condon, consulting engineer, Century Wood Preserving Co., Pittsburgh, Pa., has been elected president of the Wood Preservers' Association for the coming year. Mr. Condon was formerly forester for the Pennsylvania Railroad.

B. F. Smith, of Elizabeth, La., is the new president of the Southern Forestry Congress. W. R. Hine, State forester of Louisiana, is secretary, and Henry Hardtner, Urania, La., is chairman of the executive committee.

R. M. Nelson, of the Bureau of Plant Industry, has been permanently stationed at Asheville, N. C., as consulting forest pathologist with the Appalachian Forest Experiment Station. Mr. Nelson is a graduate of the University of Minnesota, and for the past year has been associated with G. F. Gravatt, associate pathologist of the Bureau of Plant Industry, in a study of chestnut blight.

Stanley P. Young, of Colorado, has been appointed head of the division of economic investigations of the Bureau of Biological Survey, in charge of activities for the control of rodents and predatory animals. Dr. A. K. Fisher, whom he succeeds, will be assigned to research in economic ornithology, consisting chiefly in studies of the economic status of hawks and owls.

John B. Glenn, of Chipley, Fla., has been appointed to the Florida Board of Forestry, filling the vacancy created by the death of E. W. Thorpe, of De Funiak Springs. N. J. Wicker succeeds Mr. Thorpe as vice president of the board.

Frank Bonner, engineer of the California National Forest District, and Frederick H. Fowler, who formerly held that position, are both members of the commission appointed by the Governor of California to investigate the causes of the collapse of the St. Francis Dam.

The personnel of the California Forest Research Advisory Council is as follows: Willis Walker, Red River Lumber Co., San Francisco; D. H. Steinmetz, Pickering Lumber Co., Standard; C. R. Johnson, Union Lumber Co., San Francisco; A. Stanwood Murphy, Pacific Lumber Co., Scotia; Swift Berry, Michigan-California Lumber Co., Camino; Edward W. Murphy, chairman, State-wide Conservation Committee, Los Angeles; A. C. Hardison, director, California Development Association, Santa Paula; Isador Zellerbach, Zellerbach Paper Co., San Francisco; Duncan McDuffie, chairman, State Parks Council, Berkeley; Francis Cuttle, chairman, Tri-Counties Reforestation Committee, Riverside; Herbert S. Gilman, president, Angeles Forest Protective Association, San Dimas; F. H. Fowler, consulting engineer, San Francisco; Ray Lyman Wilbur, president, Leland Stanford Jr. University; Charles G. Dunwoody, director, conservation department, California Development Association, San Francisco; M. B. Pratt, State forester; Spence D. Turner, county forester, Los Angeles County; Prof. Walter Mulford, University of California; B. A. McAllister, land commissioner, Southern Pacific Railway Co., San Francisco; H. M. Robinson, president, First National Bank, Los Angeles; E. E. Brownell, director, California Woolgrowers Association, San Francisco; W. W. Campbell, president, University of California, Berkeley.

Charles B. Wing, of the engineering department of Stanford University, has been appointed director of State parks of California.

C. Edward Behre has resigned as associate silviculturist of the Northeastern Forest Experiment Station, with which he has been connected since 1923, to take up farming near Amherst, Mass.

Reuben W. Smith, formerly assistant professor of wood preservation at the New York State College of Forestry and more recently manager of the consulting department of the Protexol Corporation of New York and Kenilworth, N. J., is now field engineer in the San Francisco office of the National Lumber Manufacturers Association.

Bruce Hoffman has left the United States Forest Service to become assistant to the president of the West Fork Logging Co., Tacoma, Wash. Since joining the service in 1910 Mr. Hoffman has served on national forests of Alaska and Oregon. Since 1919 he has held the position of chief logging engineer of the district office of the service at Portland, Oreg.

New officers of the New England section, Society of American Foresters, are E. C. Hirst, chairman, and Albert C. Cline, secretary. H. I. Baldwin has been elected to the executive committee.

Officers of the Allegheny section, Society of American Foresters, for the coming year are J. S. Illick, chairman; K. E. Pfeiffer, vice chairman; and H. F. Round, secretary-treasurer.

Hon. John D. Clarke is president of the New York Forestry Association for 1928. Robert M. Thompson has been made president emeritus, J. R. Simmons secretary-forester, Sherman D. Fuller treasurer, and John D. Clarke chairman of the executive committee.

Howard M. Wight has been appointed special investigator to assist Alvin G. Whitney, professor of zoology in the Michigan School of Forestry and Conservation. His work at Michigan begins with a study of the 200 private wild-life refuges in the State. Professor Wight was for several years instructor and professor of zoology in the Oregon Agricultural College, where he carried on graduate work in that subject. During the past year he attended the Iowa State College as a candidate for the doctor's degree.

J. Nelson Spaeth, of the Forestry Department of the New York State College of Agriculture, will spend May and June in the forests of the Northwest, making a study of white pine blister rust on western white pine for the Bureau of Plant Industry.

Franklin W. Reed, of Washington, D. C., has been appointed industrial forester for the National Lumber Manufacturers' Association. He will undertake a study of forestry projects being carried on by the lumber and pulpwood industry, the results of which will be published in pamphlet form and also prepared for magazine publication. Mr. Reed has been associated for the past four years with Benedict and Rue, forest engineers of Washington. Previously he served for five years as district forester of the Eastern National Forest District.

Roy A. Phillips, inspector of improvement work in the Northern National Forest District, has been assigned as supervisor of the Nezperce National Forest, Idaho.

James E. Ryan, supervisor of the Blackfeet National Forest, Mont., has been transferred to the supervisorship of the Kaniksu National Forest, Wash., from which J. C. Whitham has been furloughed because of ill health. His successor on the Blackfeet Forest is William M. Nagel. Mr. Nagel's successor as supervisor of the Missoula National Forest, Mont., is James F. Brooks, who has been assistant supervisor of the St. Joe National Forest, Idaho.

J. W. Girard, formerly a logging engineer of the United States Forest Service and more recently general manager of the Herrick logging enterprise at Burns, Oreg., has since the closing down of this operation become manager of the Coeur d'Alene Mill Co., with headquarters at Coeur d'Alene, Idaho.

E. P. Meinecke, pathologist of the Bureau of Plant Industry stationed at the San Francisco office of the Forest Service, has sailed for a six-month tour of Europe. Doctor Meinecke will make observations on the larch canker, the European elm disease, and other European tree diseases that are likely to be introduced into this country.

Bibliography

Forest Soils

By E. N. Munns, United States Forest Service

Every forester interested in the relationship of forests and soils, and that should include every technical forester, should read "The Study of Forest Soils," by Dr. Fr. Weis, of the Royal Agricultural College, Denmark. This paper, published in Soil Science for January, 1928, is the summary of the forestry section of the First International Congress of Soil Science held in Washington last June.

Doctor Weis points out that forest soil problems are most acute in temperate or cold humid regions and at high elevations, because in these localities only "are we dealing with one of the most fundamental phenomena in forest soils, i. e., the formation and accumulation of raw humus." He points out that if the forest soil is to be maintained in a healthy condition it is important that this raw humus be so treated that decomposition is hastened.

On six points the soil scientist can advise the forester in his general problem of maintaining healthy forest conditions and of obtaining the maximum tree growth. These are the effect of fires, of forest management, and of excess water upon the soil properties; the relation of forests to ground water; the use of soil surveys for mapping types and sites; and the use of a simple soil factor to evaluate forest sites.

Doctor Weis indicates striking differences between the study of agricultural soil and that of forest soil. How exactly his classification applies to the soils of this country is open to question; but since only a very limited amount of work has been done in America upon forest soils, the classification can be accepted for the time being.

American foresters have too long concentrated their attention on the outward evidences of growth—diameter, height, volume—and neglected to study the soil. It should be remembered that of all the various factors entering into site, the soil is the only one which man can modify or change through management. The weather elements are beyond our control, we must accept the topography and geology as nature gives them to us, we can not change a forest's history; but we can modify soil conditions. Each time we thin or harvest a stand, graze or burn over an area, one way or another a change is set up in the soil. The basic facts of the anatomy, physiology, and biology of the soil are revealed by the soil of the virgin forest. Only through the use of virgin forest soils as a standard can we know what changes our system of management, our forest practices, our handling of the cover will effect in the soil. (For the most part one is inclined to believe that present practices are affecting forest soils for the worse.) Most of our old-growth forest on which grazing is possible has already been put to that use. By far the greater part has already been cut over, and much of that remaining has been obligated or is being obligated for cutting. It is by no means too early to be setting virgin forest areas aside to be retained in a natural state.

Forest Thoroughbreds

By W. N. Sparhawk, United States Forest Service

Only within the last two or three decades have the careful selection of seed and the breeding of especially adapted varieties of crop plants come into practice as important factors in increasing the quantity and quality of agricultural yields. Although a few "super-technical" foresters have suggested that similar measures might be worth trying in silviculture, most foresters have been inclined to scout the suggestion on the ground that tree generations are too long. To such, Walter Seitz's recent book (Edelrassen des Waldes, Berlin, 1927) should give food for thought.

Seitz points out that the desirable races of trees do not have to be created through breeding, as did most of the finer varieties of agricultural plants, but already exist and can be identified at all stages of growth. He asserts that the many "source-of-seed" experiments that have been undertaken in Europe (his statement would apply in the same way to those undertaken in the United States), as well as the present German plan of certifying forest tree seed, have started with an erroneous assumption, viz., that racial differences in tree species are climatic or regional, so that all seed from a given locality belong to one race. On the contrary, he says, plants from one lot of seed may differ just as widely as plants from different lots. One stand may be composed of trees of several distinct races. Not only may the individuals in a given stand differ greatly in form, appearance of bark and foliage, and growth habits in general, but it has been observed, for instance, that certain individual trees in a stand are consistently avoided by caterpillars, year after year, and that certain individuals escape damage when their neighbors are damaged by frost or fungous diseases. It is necessary, then, to select seed trees on the basis of the individual trees, not the locality in which they grow.

Seitz discusses the oaks Q. pedunculata and Q. sessiliflora and their hybrids, especially two which

have acquired stable heritable characteristics (designated as Q. aequalis and Q. cerrifolia), and Scotch pine, of which he selects two varieties believed to be pure strains of the original pine, native to Germany since the last ice age. The other and more common pines are believed to be descendants of races that crept in from the south after the glacial period. They are likely to be inferior to the native races in form and in resistance to various natural enemies, and their wood is decidedly inferior in quality. The original races have been able to maintain themselves in a comparatively pure form, in spite of the susceptibility of pine to crosspollination, owing to the fact that they usually flower later than the races of southern origin.

It is pointed out that almost any lot of commercial seed (either pine or oak) contains seed of several races, and that the small seed as likely as not come from the more desirable parents. It is desirable, therefore, before sowing, to grade the seed by size and to sow the small seed by itself. If this is not done, it is argued, more vigorous seedlings from large seed of inferior parents may crowd out smaller but ultimately better plants. It is stated that seed production of selected trees can be stimulated by loosening the soil beneath them and covering it with a mulch consisting in a thick layer of grass, straw, or fine litter.

As might be expected of a German forester, Seitz recognizes wild game as an important forest product, and is keenly interested in developing thoroughbred deer as well as trees. He concludes with a chapter on the possibility of accomplishing this through selective shooting.

The book is profusely illustrated with excellent plates which show some fine examples of large old pines and oaks.

Forest Fires in Minnesota

An important step in solving the problem of forest fires in Minnesota, which burn over about 400,000 acres yearly, is an analysis of the reasons for the 1,000 to 1,300 fires that, on the average, run through the timber each year and for the losses, averaging over a million dollars a year, which they entail. Such an analysis is given in a bulletin just issued by the Minnesota Forest Service, entitled "Forest Fires in Minnesota." The study was made by J. A. Mitchell, of the Lake States Forest Experiment Station, in cooperation with the State forestry officials.

During the past 10 years, according to the bulletin, the average number of forest fires has increased 100 per cent, largely as a result of land-clearing activities and of increases in the area of cut-over land and in the number of people who visit the forested region for sport and recreation. Land clearing was responsible for 27 per cent of the fires in the 10 years 1916 to 1925 inclusive, railroads for 21.7 per cent, campers and smokers for 21.1 per cent, and miscellaneous causes for the rest. Efforts of State and local forest officers and private owners have decreased the size of the average fire 64 per cent and the average burned area 25 per cent in spite of the greater number of fires. Large fires are responsible for the bulk of the losses. During the 10 years covered by the study 7 per cent of the fires were over 1,000 acres in size and these fires were responsible for 71 per cent of the area burned, 63 per cent of the total damage, and 47 per cent of the suppression costs. All of the great conflagrations have been the result of prolonged drought, high winds, and numerous uncontrolled small fires. All of Minnesota's great forest fires have occurred in late September or early October.

Approximately 23,500,000 acres of forest land in the State are in need of organized protection. It is estimated that the merchantable timber on this land is worth about $105,000,000 and that the annual growth of pulpwood and saw timber is worth $2,750,000.

The conclusion reached from the study and analysis of the situation is that the permanent protective force needs to be double what it is now, and that additional lookout towers and fire-fighting equipment, a trained emergency force, and additional funds are required. The cost of adequate protection is estimated at $650,000 annually, of which $100,000 would constitute an emergency fund for abnormally bad seasons.

Inquiries in regard to the bulletin may be addressed to the Lake States Forest Experiment Station, St. Paul, Minn., or to the Commissioner of Forestry and Fire Prevention of Minnesota.

Scaling Manual

By J. A. Fitzwater, United States Forest Service

A revised edition of the Forest Service timber-scaling manual has just been made available. In form and presentation it very closely follows previous issues. The principal change consists in the addition of instructions and diagrams describing the methods used in making deductions for the common forms of defect. Owing to the difference in the action of any given fungus in different species and under different soil and climatic conditions no attempt has been made to include instructions covering deductions for defects originating from fungi other than those which take the form of center or circular rots. Other changes consist in acknowledging knots under certain conditions as a defect, permitting 40-foot logs to be scaled as single logs in the national forests of Alaska and west of the summit of the Cascade Mountains in Washington and Oregon, and permitting 17-foot logs cut for 8½-foot ties to be scaled as single logs. The tables and sample forms in the appendix have been revised.

Copies of this manual (Instructions for the Scaling and Measurement of National Forest Timber) can be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 35 cents a copy.

Recommending a Book on Forest Botany

By E. N. Munns, United States Forest Service

To one who comes in contact with the written product of many foresters, it appears that foresters are woefully lacking in botanical training. Some of this deficiency is traceable to inadequate high-school training, some is due to a slighting of botany in the college course. Every forester should have a working knowledge of botany, and one method by which the interest of the undergraduate could be aroused in such subjects as plant physiology and ecology would seem to be through a short course in botany using the tree as the example, following some such book as Somerville's How a Tree Grows.

This little book is the outgrowth of a series of lectures given to Oxford students. With its numerous illustrations and carefully and clearly written text, it gives much of that background so badly needed by the practicing forester. The author follows the title of his book very closely all the way through except as he leaves the discussion of wood structure to take up questions of wood identification. Although English species are used as examples for the most part, that fact does not obtrude as in some other British forestry literature.

The book is well worth the while of the older forester as a means of refreshing one's knowledge of elementary botany if for no other reason.

(William Somerville: How a Tree Grows. pp. 205, il. 112. Oxford University Press. Humphrey Milford, London, 1927.)

Timber Growing and Logging Practice in the Lake States

Raphael Zon's contribution to the series of bulletins on timber growing and logging practice in the various forest regions of the United States is a singularly clear and practical presentation of the steps necessary to prevent timberland in the Lake States from becoming barren and those additional steps necessary to establish desirable forestry practice on the land. The author has gone so far as to summarize these steps in parallel columns at the end of the bulletin. This summary is truly multum in parvo and is a striking evidence of the sureness and understanding with which the whole subject is handled.

To prevent timberland from becoming barren the principal steps to be recommended are (1) fireproofing the woods, as far as possible, by slash burning or other ways of reducing the fire danger from slash or debris left after cutting, and (2) keeping fire out of the woods thereafter by a protective organization.

For desirable forestry practice Zon recommends cutting under the "selective" system, by which young reproduction is safeguarded, and control of the most valuable species by favoring these and cutting out the less valuable ones. Release cuttings, thinnings, and underplantings also are advocated and where advisable, plantings to stock barren lands. Good forest management also may involve certain protective measures against diseases and insects.

Prescribing what he terms "first aid to reforestation," Zon declares that fire prevention is the key to the situation. Slash disposal is an effective means of reducing the fire hazard. Other "first aids" are good logging practice—cutting to a certain diameter limit and saving young and unmerchantable trees—and stabilization of forest taxation, in which the Lake States already are making considerable progress.

The bulletin contains detailed discussions of the measures best suited for the various types of forest in the Lake States, clarified and made interesting by many concrete illustrations.

The title of the bulletin is "Timber Growing and Logging Practice in the Lake States." Copies may be obtained, while the supply lasts, by writing to the United States Department of Agriculture, Washington, D. C.

Three New Tree Books

Tree lovers of Louisiana are indebted to Caroline Dormon, of the forestry division of the Louisiana Department of Conservation, for a recent publication of the department entitled "Forest Trees of Louisiana and How to Know Them." Descriptions of 100 species appear in this booklet, written in a pleasantly informal way by one who has had many years' experience in making Louisiana people acquainted with Louisiana trees.

A new tree guide has been published by the New York State College of Agriculture, Cornell University, as the joint work of J. A. Cope and Gardiner Bump. "Fifty Common Trees of New York" has been prepared specifically to meet the needs of Four-H clubs in their "forest appreciation" studies. The descriptions of tree species are prefaced by directions for using the bulletin and for making the tree collection which, with training in tree identification and instruction in tree uses, is included in the second-year work of Four-H clubs studying forestry.

A pocket manual entitled "Forest Trees of Oklahoma" has made its appearance as the fourteenth in the series of tree guides prepared for as many States through cooperation of State forestry officials and W. R. Mattoon, of the United States Forest Service. Altogether, 74 species are described. The trees that are described here for the first time in the tree-guide series are the nut pine or pinon, shin oak, and mesquite.

All three of these booklets are illustrated from original drawings by Mrs. A. E. Hoyle, United States Forest Service.

Windbreaks and Shelter Belts for Maryland

By J. H. BUELL, United States Forest Service

A 39-page pamphlet by Fred B. Trenk on "Windbreaks and Shelter Belts for Maryland," published by the Maryland State Department of Forestry, as described in the introduction by F. W. Besley "sets forth in an orderly way complete information regarding windbreaks, the purpose they serve, how they may be established and maintained, and the benefits to be derived from them."

A short review of the causes and behavior of winds is followed by a discussion of the protection afforded to farmsteads and crops by windbreaks and shelter belts. They break the mechanical force of the wind, reduce evaporation, and intensify and modify temperatures on their leeward sides. Mr. Trenk tells how a windbreak's efficiency is affected by its orientation, the surrounding topography, and the height of the trees and the density of their crowns. He considers also the disadvantages of windbreaks—the shading of adjoining lands, the sapping of moisture and plant food from these lands, and the possibility of causing frost pockets.

Characteristics of trees desirable and undesirable for windbreaks and shelter belts are discussed and set forth in tabular form. Instructions for establishing and maintaining effective windbreaks and shelter belts are given and approximate costs of establishment per 100 linear yards are presented in tables.

Much of the information contained in the bulletin is widely applicable and does not by any means relate exclusively to Maryland or even to the Middle Atlantic States.

Danish Experimental Forestry Service

The Danish Experimental Commission has issued a small volume, entitled "Danish Experimental Forestry Service, Account of the Agency, 1901–1926" which gives a short résumé of the development of experimental forestry in Denmark from 1793 to 1926, and of the work now being done. It contains also a list of the publications issued from 1905 to 1926 and of the personnel from 1901 to 1926. Brief mention is made of outstanding leaders like C. D. F. Reventlow, who did the first work on tree growth and test of exotic species, and C. V. Opperman, who initiated sample plot control and whose work was later carried on and expanded by Ch. Lütken.

Present research in Denmark deals primarily with growth and yield of native species under different methods of treatment; growth of introduced species such as Douglas fir and Sitka spruce; soils investigations, particularly in the heath type; investigations of tree races and genetics; and the use of timber and timber products.

Sixty-five excellent photographs are included.

Forest Tree Nursery Suggestions for North Dakota Farms

Directions for establishing and operating forest tree nurseries on North Dakota farms are given in Extension Circular No. 3, The Farm Nursery for Forest Trees, by State Extension Forester Charles A. Gillett. Each member of the junior forestry clubs of the North Dakota Extension Service is required to raise by himself enough trees for one adequate shelter belt, and this circular is being placed in the hands of all members as a working manual. It deals systematically with the subject from source of seed through the seed-bed and transplanting process to the time when the stock is ready for planting. The aim of the circular is to educate the rural boys and girls of North Dakota along constructive forestry lines and to encourage the establishment of new windbreaks in that State.

Two papers by Donald Bruce that appeared in the Journal of Agricultural Research, "A Method of Preparing Timber-Yield Tables" and "Some Possible Errors in the Use of Curves," are now available for distribution as reprints. Requests should be addressed to the Forest Service, Washington, D. C.

Recent Books and Pamphlets

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Chamber of Commerce of the United States, Natural Resources Production Department: Progress in commercial forestry. 18 pp. Washington, D. C., 1927.

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Japanese Ministry of Agriculture and Forestry: The statistical abstract, 1926. 165 pp. Tokyo, 1927.

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Knight, E. V., and Wulpi, M. (editors): Veneers and plywood. 372 pp. il. Ronald Press Co. New York, 1927.

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Schmitz, H., and Jackson, L. W. R.: Heartrot of aspen. 43 pp. (Minnesota Agricultural Experiment Station technical bulletin 50.) St. Paul, 1927.

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United States Congress, House Committee on Flood Control: Flood control in the Mississippi valley: report to accompany H. R. 8219. 395 pp. (70th congress, 1st session. House report no. 1072.) Washington, D. C., 1928.

United States Congress, House Committee on Flood Control: Flood control on the Mississippi river and its tributaries: report to accompany S. 3740. 109 pp. (70th congress, 1st session. House report no. 1100.) Washington, D. C., 1928.

United States Congress, Senate Committee on Agriculture and Forestry: Forestry research: hearing on S. 1183, Feb. 28, 1928. 121 pp. Washington, D. C., 1928.

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Recent Publications of the Forest Service

Map Folders: Inyo, Whitman, Shenandoah, Siskiyou, Snoqualmie, and Kaibab.

Miscellaneous Publication 20, A Forest Fire Prevention Handbook for Schools of Oregon.

National Forest Administrative Maps: ¼-inch, Kaniksu, Pend Oreille, Caribou, Payette, Ashley; ½-inch, California (three colors); 1-inch, Clifton Division, Crook (three colors).

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